Patient Attrition Between Diagnosis With HIV in Pregnancy-Related Services and Long-Term HIV Care and Treatment Services in Kenya: A Retrospective Study

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Background: There has been little attention, until recently, to linking women who test HIV positive in pregnancy-related services to long-term HIV care and treatment services.

Methods: A retrospective review of routine hospital data was carried out in 2 hospitals in Kenya. Associations between available demographic information and uptake of HIV-related services within 6 months of HIV diagnosis in pregnancy-related services were assessed using logistic regression. Kaplan–Meier survival analysis was used to assess time between HIV diagnosis and registration at the HIV clinic. Referrals between pregnancy-related and HIV-related services were observed.

Results: At Naivasha hospital, the proportion of women registering at the HIV clinic within 6 months was 17.2% (153 of 892); at Gilgil hospital, it was 35.4% (84 of 237). Highly active antiretroviral therapy (HAART) was initiated by 40% and 27% of known eligible women in Naivasha and Gilgil, respectively. Non-systematic registration of clients on first contact at the HIV clinic, and restricted availability of services due to costs and opening hours were observed. In Naivasha, year, attendance at multiple pregnancy-related visits, and attendance at antenatal care in Naivasha hospital were associated with registration at the HIV clinic. In Gilgil, year, attendance at multiple pregnancy-related visits, and women being in their first pregnancy were associated with the outcome.

Conclusions: Only 4% of women estimated to need HAART for their own care initiated HAART within 6 months of HIV diagnosis. Challenges associated with providing longitudinal care are especially evident in the context of high population mobility. Innovation in service delivery is required to improve uptake of services.

Key Words: HIV, patient dropout, pregnant women, Kenya

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INTRODUCTION

Highly active antiretroviral therapy (HAART) during pregnancy and breastfeeding significantly reduces vertical HIV transmission relative to short-course antiretroviral regimens.[1–4]

The rationale for HAART for the pregnant woman's own health, to greatly improve her survival and avoid maternal orphanhood is equally compelling[5,6] but has received much less attention.[7] There is increasing concern about whether or not women diagnosed with HIV in pregnancy-related services access long-term HIV care and treatment services, but little is known about the factors affecting this.

In Kenya, we quantified client attrition along the pathway between testing HIV positive in antenatal or delivery services (collectively 'pregnancy-related services') and accessing HIV-related services. We assessed factors associated with uptake of HIV care and treatment services to inform the design of interventions to minimize client dropout.

METHODS

Setting

This study was carried out at the 2 government hospitals in Naivasha district, Rift Valley province, Kenya.

According to Kenyan guidelines, all women attending pregnancy-related services with unknown HIV status or who most recently tested HIV-negative more than 3 months previously should be offered provider-initiated HIV testing and counseling as standard care.[8] Rapid HIV tests are used, and antiretroviral drugs are provided free of charge to those who require them.

The 2008–2009 Demographic Health Survey in Kenya found that 92% of pregnant women had received antenatal care (ANC) from a medical professional.[9] Fifty-six percent of

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women who attended ANC were reported to have been counseled about HIV, tested, and received the results during ANC.[9] National HIV prevalence among women aged 15–49 in 2007 was 8.8%.[10]

Kenya has been a pioneer for many prevention of mother-to-child transmission (PMTCT) of HIV policies in Africa. National guidelines issued in 2005 already recommended life-long HAART for pregnant women with a CD4 count ≤350 cells per cubic millimeter.[11] For pregnant women with a CD4 count >350 cells per cubic millimeter, a triple combination of short-course antiretroviral therapy for PMTCT has been recommended since 2009.[12] As elsewhere, however, the success of these policies is dependent on the health system being able to deliver the recommended interventions.

There was a mean of 260 new antenatal clients per month and 400 deliveries per month at Naivasha District Hospital in the first 6 months of 2010. Gilgil Sub-District Hospital reported approximately 110 new antenatal clients and 80 deliveries per month. HIV prevalence among antenatal women was about 4% in Naivasha and 6% in Gilgil during this period.

In each hospital, every weekday, 1 nurse was responsible for HIV counseling and testing in ANC before assisting with other maternal and child health services. All women who tested HIV positive within pregnancy-related services should have been immediately referred to the HIV clinic. Both hospitals have an on-site HIV clinic; in Naivasha hospital, it is situated within 2 minutes' walk of ANC, whereas in Gilgil, it is a 5–10 minute walk away.

Registration at the HIV clinic cost KShs20 ($0.23) and KShs100 ($1.15) and CD4 count testing cost KShs170 ($1.95) and KShs120 ($1.38) in Naivasha and Gilgil hospitals, respectively.

These facilities constitute a convenience sample of hospitals selected because they were government hospitals without high levels of external support.

Methods

A retrospective review of routine hospital data was carried out in 2 hospitals to construct a retrospective cohort of women diagnosed with HIV in the context of pregnancy and to assess their uptake of HIV-related services. The cohort included all women aged 15 and older who were recorded as having been diagnosed with HIV in pregnancy-related services between January 1, 2008 and June 30, 2010.

Each woman was given a unique study number to enable analysis of her recorded use of services across different hospital visits and clinical departments. A "matching" algorithm was devised based on ANC numbers, hospital visit dates, and available demographic information (name, age, location of residence, and gestational age) to identify and link data on repeat-attendees within pregnancy-related services and to assess uptake of services at the HIV clinic. The matching algorithm was validated using a subset of women enrolled in a prospective cohort study in Naivasha hospital for whom information on uptake of services was available. It was found to correctly match 97% of women across different hospital visits. For women who attended the HIV clinic, their patient files were reviewed to record uptake of CD4 count testing and HAART. All data were entered into Epi-Data 3.1 (The EpiData Association, Odense, Denmark) and analyzed in Stata 10.1 (Statacorp, TX).

Using 6 months of follow-up time per woman, starting from her earliest recorded visit to pregnancy-related services during the study period, uptake of HIV-related services was quantified for each hospital. Fisher exact tests were used to assess differences between the hospitals.

Based on a priori hypotheses, univariable logistic regression was carried out to assess associations between available information and uptake of HIV-related services. Multivariable logistic regression analyses were carried out using all variables with a P value ≤0.10 in the univariable analyses. Variables not associated with the outcome in the multivariable model were removed in a stepwise manner so that the final model only included variables associated with registration at the HIV clinic ($P \leq 0.10$). Despite its potential to overestimate effect sizes, a step-wise approach was adopted to improve coverage of the model in the context of large amounts of missing data for some variables. Due to missing data, all univariable analyses were re-run restricted to participants with no missing data. Study participants included in the final multivariable models were restricted to those for whom there were no missing data for the variables in the model.

Kaplan–Meier survival analysis and a log-rank test for equality of survivor functions were carried out to assess time between HIV diagnosis and registration at the HIV clinic, and any differences in this between hospitals.

Relevant policies and guidelines were consulted and hospital processes relevant to the pathway between HIV testing in pregnancy-related services and the HIV clinic were observed in 2009–2010 to identify where practice differed from policy.

Ethical approval for this work was provided by the University of Nairobi Kenyatta National Hospital Ethics Review Committee and the London School of Hygiene and Tropical Medicine Ethics Committee. To preserve confidentiality, all files and databases were password-protected and, after matching and the assignment of unique study numbers, all personal identifiers were removed from active files.

RESULTS

Cohort Characteristics

Eight hundred and ninety-two women in Naivasha hospital and 237 women in Gilgil hospital were recorded as having been diagnosed with HIV in pregnancy-related services in the study timeframe. Available demographic information relating to these women is presented in Table 1.

In Naivasha, more women were married, lived nearer to the hospital, and only attended the hospital for delivery services (ie, if they attended ANC at all, it was at a different health facility) than in Gilgil.

There were a lot of data missing from the registers, especially from the delivery register in Naivasha. As 56% of study participants at Naivasha hospital had only attended for delivery, this affected a large proportion of the study participants.

TABLE 1. Characteristics of Women Who Tested HIV-Positive in Pregnancy-Related Services, January 2008 to June 2010

	Naivasha Hospital n = 892	Gilgil Hospital n = 237
Year of first recorded hospital visit		
2008	377 (42.3%)	110 (46.4%)
2009	362 (40.6%)	91 (38.4%)
2010	153 (17.2%)	36 (15.2%)
Total with data	892	237
Age		
15–19	58 (7.4%)	18 (7.7%)
20–24	259 (33.2%)	78 (33.3%)
25–29	250 (32.1%)	69 (29.5%)
30–44	213 (27.3%)	69 (29.5%)
Total with data	780	234
Marital status		
Married	589 (86.0%)	179 (78.9%)
Widowed	11 (1.6%)	2 (0.9%)
Divorced	26 (3.8%)	16 (7.1%)
Single	52 (7.6%)	28 (12.3%)
Separated	7 (1.0%)	2 (0.9%)
Total with data	685	227
Number of pregnancies		
1	125 (19.8%)	45 (19.9%)
2	209 (32.0%)	68 (30.1%)
3	164 (25.9%)	62 (27.4%)
4+	135 (21.3%)	51 (22.6%)
Total with data	633	226
Gestational age*		
8–21 weeks	55 (17.0%)	30 (17.5%)
22–27 weeks	91 (28.1%)	43 (25.2%)
28–34 weeks	111 (34.3%)	59 (34.5%)
34–39 weeks	67 (20.7%)	39 (22.8%)
Total with data	324	171
Distance		
≤15 mins walk from home to clinic	363 (56.2%)	108 (49.3%)
>15 mins walk or having to pay for transport	283 (43.8%)	111 (50.7%)
Total with data	646	219
MCH register where woman first appeared		
ANC	395 (44.3%)	205 (86.5%)
Delivery	497 (55.7%)	32 (13.5%)
Total with data	892	237

*Analysis restricted to visits that are noted in the antenatal register to be first visits for the current pregnancy.

Processes for Linking Women into Long-Term HIV Care and Treatment Services

Observation in the study hospitals found that although there was a policy of nurses escorting women diagnosed with HIV in pregnancy-related services to the HIV clinic in both hospitals, in practice, staffing constraints sometimes prevented this. On first contact at the HIV clinic in Gilgil hospital, women were registered and referred to the laboratory (situated adjacent to the HIV clinic) for a blood draw for their CD4 count. In Naivasha, this was less systematic, with some women not registered for HIV care until the result of their CD4 count test was available, which could have been at their third HIV clinic visit.

The PMTCT Cascade

Figure 1 shows client attrition between testing HIV-positive in pregnancy-related services and accessing HIV-related services in the study hospitals.

At Naivasha hospital, the proportion of women who registered at the HIV clinic within six months was 17.2% (153 of 892), whereas at Gilgil hospital, it was 35.4% (84 of 237; $P < 0.001$). There was additional high dropout after the initial visit to the HIV clinic. Uptake of CD4 count testing was suboptimal: 99 of 153 (68%) and 36 of 84 (43%) in Naivasha and Gilgil, respectively. A high proportion of women for whom a CD4 count was available were eligible for immediate HAART, but uptake of HAART among these women was low at 40% in Naivasha and 27% in Gilgil.

Factors Associated With Registration at the HIV Clinic

Data from the 2 hospitals were analyzed separately due to the differences in attendance patterns and processes for linking women into HIV care.

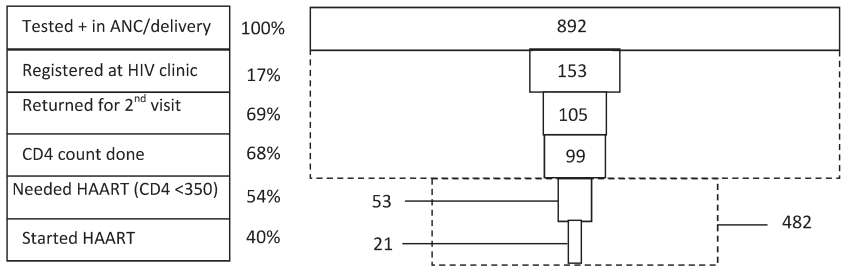
Univariable logistic regression analyses assessing factors associated with registration at the HIV clinic within 6 months of HIV diagnosis in pregnancy-related services are presented in Table 2.

In both hospitals, linkage into HIV care was lower among women who first appeared in the delivery register rather than the ANC register; in Naivasha, this was particularly marked (9.9% vs. 26.3%; $P < 0.001$). Linkage into care was lowest among women who only attended pregnancy-related services once, many of whom, in Naivasha, only attended for delivery.

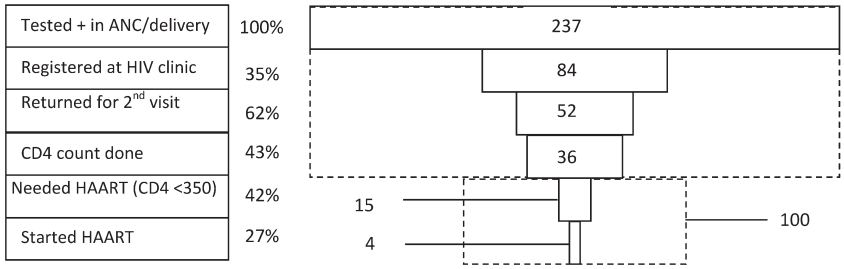
Just over half of the study participants received both maternal and infant prophylaxis: 462 of 892 (51.8%) in Naivasha and 149 of 237 (62.9%) in Gilgil. There was a suggestion of an association at both hospitals between receiving both maternal and infant prophylaxis and registering at the HIV clinic within 6 months, particularly in Naivasha where 20.4% of women who had received both prophylaxis registered at the HIV clinic versus 13.7% of women who did not receive both types of prophylaxis ($P = 0.009$).

Associations with the other factors measured differed between the study hospitals. In Naivasha, registration improved over the study period from 12.5% in 2008 to 33.3% in 2010, but this was not the case in Gilgil. There was no evidence of a linear trend in HIV clinic registration over time in either hospital (likelihood ratio test for departure from linear trend: $P = 0.031$ in Naivasha and $P = 0.075$ in Gilgil). In Gilgil, women in their first pregnancy were more likely to register than women in subsequent pregnancies.

Rerunning the univariable analyses restricted to participants with no missing data (n = 533), the only variable for which the result differed substantively was living far from the clinic (OR: 0.77; $P = 0.184$ changed to OR: 0.67; P value = 0.074). Due to the volume of missing data, this variable was not included in the multivariable model.



- If no drop-out, all 892 women would have attended initial screening.
- Of these, 482(53/99 = 54%; 892*54% = 482) would have been eligible for, and started, HAART.
- Only 21 actually started HAART: 40% (21/53) of all those who should have.



- If no drop-out, all 237 women would have attended initial screening.
- Of these, 100 (15/36 = 42%; 237 * 42% = 100) would have been eligible for, and started, HAART.
- Only 4 actually started HAART: 27% (4/15) of all those who should have.

The boxes with solid lines show the actual number of women who completed each step along this pathway. On the left-hand side are the percentages of women completing each step in the cascade; the denominators are the number of women in the previous line of the diagram, with the exception of the percentage of women who had a CD4 count test, for which the denominator is the number of women registered at the HIV clinic. The dotted lines show an ideal patient cascade i.e. with no patient drop-out, which is explained in the bullet points under each diagram.

FIGURE 1. Client attrition along the extended PMTCT cascade 6 months after HIV diagnosis.

In univariable analysis, there was no significant association between registration at the HIV clinic within 6 months of diagnosis and age, marital status, distance from the hospital, or gestational age at first ANC visit at either hospital.

Different factors were included in the multivariable logistic regression models for each hospital (Table 3).

In Naivasha, only year of first recorded hospital visit, attendance at multiple pregnancy-related visits, and appearing in the hospital's ANC register were associated with registration at the HIV clinic. In Gilgil, year and attendance at multiple pregnancy-related visits were also associated with the outcome, but attendance at Gilgil hospital's ANC services was not. Women in their first pregnancy were 3 times more likely to register at the HIV clinic than women in a subsequent pregnancy in Gilgil.

Time to Registration at the HIV Clinic

Time to registration at the HIV clinic was analyzed separately for each hospital (Fig. 2).

Time-to-registration was shorter at Gilgil hospital than at Naivasha hospital ($P < 0.001$). Around one-quarter of women registered at the HIV clinic immediately after their HIV diagnosis in Gilgil, whereas this proportion was much lower in Naivasha. After this initial difference, registration at the HIV clinic followed a similar pattern in the 2 hospitals of very gradual additional uptake of services over the 6-month period.

DISCUSSION

Of all the women diagnosed with HIV in pregnancy-related services, only 17% and 35% in Naivasha and Gilgil, respectively, registered at the HIV clinic within 6 months of diagnosis. Of particular interest was the low level of registration at the HIV clinic among women who had only attended pregnancy-related services once at the study hospitals and, in Naivasha, women who had only attended for delivery. This may be partly explained by the high levels of migrant labour in Naivasha and women's propensity to mobility around the time of delivery. It highlights the challenges

TABLE 2. Factors Associated With Successful Registration at the HIV Clinic Within 6 Months of HIV Diagnosis in Pregnancy-Related Services

	Naivasha District Hospital			Gilgil Sub-District Hospital		
Description	Registered (Row %)	UnAdjOR*	95% CI	Registered (Row %)	UnAdjOR*	95% CI
Year of first recorded visit		$P < 0.001$			$P = 0.032$	
2008	47/377 (12.5)	1.00		35/110 (31.8)	1.00	
2009	55/362 (15.2)	1.26	0.83 to 1.91	41/91 (45.1)	1.76	0.99 to 3.13
2010	51/153 (33.3)	3.51	2.23 to 5.52	8/36 (22.2)	0.61	0.25 to 1.48
Age		$P = 0.680$			$P = 0.836$	
15–19	9/58 (15.5)	1.00		8/18 (44.4)	1.00	
20–24	54/259 (20.9)	1.43	0.66 to 3.10	29/78 (37.2)	0.74	0.26 to 2.09
25–29	52/250 (20.8)	1.42	0.66 to 3.10	24/69 (34.8)	0.67	0.23 to 1.91
30–44	38/213 (17.8)	1.18	0.54 to 2.61	23/69 (33.3)	0.63	0.22 to 1.80
Marital status		$P = 0.432$			$P = 0.444$	
Married	109/589 (18.5)	1.00		67/179 (37.4)	1.00	
Single	11/52 (21.2)	1.18	0.59 to 2.37	12/28 (42.9)	1.25	0.56 to 2.81
Separated†	0/7 (0.0)			0/2 (0.0)		
Divorced†	2/26 (7.7)	0.56	0.22 to 1.47	3/16 (18.8)	0.56	0.19 to 1.60
Widowed†	3/11 (27.3)			2/2 (100.0)		
Distance from home to hospital		$P = 0.186$			$P = 0.482$	
≤15 Minutes walk	78/363 (21.5)	1.00	—	35/108 (32.4)	1.00	—
>15 Minutes walk or having to pay for transport	49/283 (17.3)	0.77	0.51 to 1.13	41/111 (36.9)	1.22	0.70 to 2.13
Timing of first antenatal visit		$P = 0.951$			$P = 0.953$	
8–21 Weeks gestation	16/55 (29.1)	1.00	—	10/30 (33.3)	1.00	—
22–27 Weeks gestation	23/91 (25.3)	0.82	0.39 to 1.74	15/43 (34.9)	1.07	0.40 to 2.87
28–34 weeks gestation	28/111 (25.2)	0.82	0.40 to 1.69	23/59 (39.0)	1.28	0.51 to 3.21
35–39 weeks gestation	17/67 (25.4)	0.83	0.37 to 1.85	14/39 (35.9)	1.12	0.41 to 3.05
MCH register where woman 1st appeared		$P < 0.001$			$P = 0.189$	
Delivery	49/497 (9.9)	1.00	—	8/32 (25.0)	1.00	—
Antenatal care	104/395 (26.3)	3.27	2.26 to 4.73	76/205 (37.1)	1.77	0.76 to 4.13
No. of pregnancies (including current one)		$P = 0.450$			$P = 0.007$	
One	19/125 (15.2)	1.00	—	25/45 (55.6)	1.00	—
Two	41/209 (19.6)	1.36	0.75 to 2.47	16/68 (23.5)	0.25	0.11 to 0.55
Three	34/164 (20.7)	1.46	0.79 to 2.70	23/62 (37.1)	0.47	0.22 to 1.03
Four+	21/135 (15.6)	1.03	0.52 to 2.02	16/51 (31.4)	0.37	0.16 to 0.84
Number of pregnancy-related visits		$P < 0.001$			$P = 0.004$	
One visit	75/664 (11.3)	1.00	—	32/124 (25.8)	1.00	—
Two visits	61/153 (39.9)	5.21	3.48 to 7.79	27/63 (42.9)	2.16	1.14 to 4.09
Three or more visits	17/75 (22.7)	2.30	1.27 to 4.16	25/50 (50.0)	2.88	1.45 to 5.70
Receipt of both maternal and infant prophylaxis		$P = 0.009$			$P = 0.370$	
No	59/430 (13.7)	1.00	—	28/88 (31.8)	1.00	—
Yes	94/462 (20.4)	1.61	1.13 to 2.29	56/149 (37.6)	1.29	0.74 to 2.25

*P values for heterogeneity based on likelihood ratio test.
†These categories were jointly anaylzed.

in providing longitudinal care services for mobile populations. Naivasha hospital is a referral facility for a large catchment area, so women travel long distances to access services there. Such women may have been unlikely to initiate chronic care in Naivasha if these services were available closer to where they lived, implying a potential need for attention to referrals to a broader selection of HIV clinics from delivery services, according to each woman's needs.

This study could only trace women from pregnancy-related services to HIV services in the same hospital and would therefore underestimate successful linkage into care if women sought HIV services at a different health facility. A prospective study carried out at Naivasha hospital in January 2010 through February 2011 found that 13% of women diagnosed with HIV in pregnancy-related services accessed HIV-related services at an HIV clinic outside Naivasha hospital (Ferguson et al, unpublished data). If it is assumed that the same proportion of women in these retrospective cohorts sought HIV care and treatment outside the study hospitals, 30% (268 of 892) and 48% (114 of 237) of women from Naivasha and Gilgil, respectively, might have registered at an HIV clinic. However, until mid-2009, there were very

TABLE 3. Multivariable Logistic Regression Model Assessing Factors Associated With Registration at the HIV Clinic Within 6 Months of HIV Diagnosis in Pregnancy-Related Services

	Naivasha Hospital, n = 892			Gilgil Hospital, n = 226		
	n	AdjOR	95% CI	n	AdjOR	95% CI
Year of first recorded hospital visit*		$P < 0.001$			$P = 0.028$	
2008	377	1.00	—	110	1.00	—
2009	362	1.22	0.79 to 1.89	84	1.92	1.03 to 3.58
2010	153	3.94	2.43 to 6.38	32	0.62	0.23 to 1.65
Number of pregnancy-related visits		$P < 0.001$			$P = 0.001$	
One	664	1.00	—	113	1.00	—
Two+	228	3.37	2.06 to 5.54	113	2.83	1.56 to 5.14
MCH register where woman first appeared		$P = 0.081$				
Delivery	497	1.00	—	—	—	—
Antenatal care	395	1.56	0.95 to 2.57	—	—	—
No. of pregnancies (including current pregnancy)					$P = 0.001$	
One	—	—	—	45	3.42	1.67 to 6.98
Two+	—	—	—	181	1.00	—

*Likelihood ratio test for departure from a linear trend: $P = 0.012$ for Naivasha hospital and $P = 0.008$ for Gilgil hospital, that is, there is no evidence of a linear trend over time in either hospital.

few HIV clinics in the study area, and this remained the case for Gilgil throughout the study period suggesting that there were few alternative clinics where women could have sought care.

Four recent studies in sub-Saharan Africa found higher linkage into HIV-related services than this study: 62%–85% of women diagnosed with HIV in the context of pregnancy registered at the HIV clinic.[13–16] In this study, additional attrition along the pathway to HAART resulted in only 40% and 27% of known HAART-eligible women in Naivasha and Gilgil, respectively, actually initiating HAART within 6 months of their HIV diagnosis. This is in line with previous studies. Nine studies in sub-Saharan Africa documented initiation of HAART among 12%–95% of women diagnosed with HIV in pregnancy-related services and known to be HAART eligible.[13–15,17–22]

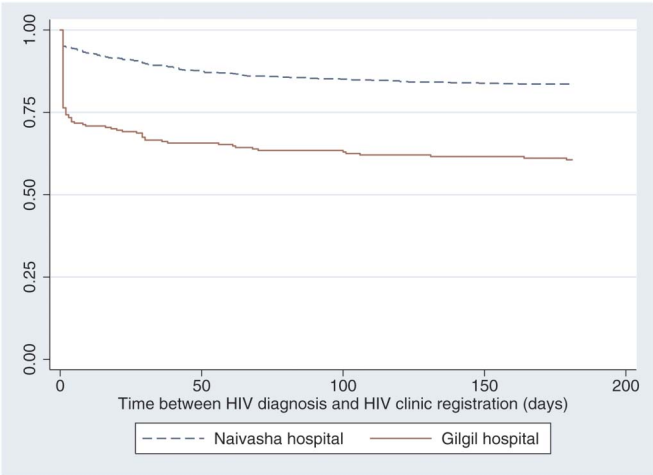


FIGURE 2. Time between HIV diagnosis in pregnancy-related services and registration at the HIV clinic.

Individual Factors Associated With Uptake of Services

In both of the study hospitals, women who attended multiple pregnancy-related appointments were more likely to register at the HIV clinic. Better compliance with the schedule of ANC visits might suggest better care-seeking behavior in general or the nurses could have used each visit as an opportunity to link women to the HIV clinic.

In Gilgil hospital, women in their first pregnancy were more likely to register at the HIV clinic than women in subsequent pregnancies, perhaps because many women in their first pregnancy are particularly nervous about their health and may be more likely to follow any advice given by health workers. This was not, however, the case in Naivasha hospital.

Given that previous research has highlighted transport costs and long travel times as barriers to accessing pregnancy-related and HIV-related services,[23–27] the lack of association between the distance between the woman's home and the hospital and registration at the HIV clinic is striking. Data on this variable were missing for 23% of the women in the study; excluding all participants with missing data, possible evidence of an association was found ($P = 0.074$). Had data on this variable been more complete, stronger evidence for an association may have been found.

Health Systems Factors Associated With Uptake of Services

The proximity of pregnancy-related services and the HIV clinic in Naivasha hospital, when compared with Gilgil hospital, did not lead to higher registration at the HIV clinic. If client escorts were more frequent in Gilgil than Naivasha, this might help explain this difference. In addition, according to national policies, registration at the HIV clinic should occur on first contact with the clinic. In Naivasha hospital, up to 3 visits could be required before registration, with staff

reporting that it was "often not worth registering someone during their first visit as many women never returned to the clinic", which might partially explain the particularly low rate of same-day registration in Naivasha.

Beyond escorting clients, there was no mechanism in either hospital for nurses in pregnancy-related services to know whether or not women they had referred to the HIV clinic ever registered there or for nurses in the HIV clinic to know when women had been referred to their clinic from pregnancy-related services. Hospitals with computer networks could set up tracking systems to enable follow-up at repeat visits to pregnancy-related services. In other settings, regular meetings between health workers in these departments could be established to try to track referral outcomes. This could be facilitated by using duplicate referral forms with one copy given to the client to take to the HIV clinic and the other copy retained within pregnancy-related services for reconciliation at the end of each month.

It would seem critical that additional counseling be provided at the time of diagnosis and repeated during subsequent hospital visits to ensure that women have sufficient information to make informed decisions about using services. This is particularly pertinent to pregnant women who have received provider-initiated HIV testing and counseling as, having come to hospital to check on the state of their pregnancy and not to seek HIV testing, they may be less psychologically prepared for an HIV-positive diagnosis and the ensuing care requirements than clients who have sought voluntary counseling and testing.[28]

Although the PMTCT guidelines stipulate that counseling for HIV-positive pregnant women should include "information and skill on how to reduce or avoid MTCT",[8] none of the counseling messages given to women mentioned that HAART is the best PMTCT intervention for immunocompromised women. As the primary focus of these women is often the health and wellbeing of their baby, this might be a useful strategy for promoting uptake of long-term HIV-related services.

Payments for registration at HIV-related services and for CD4 count tests in both hospitals likely contributed to the low levels of uptake. Costs of services have been identified as an important disincentive to accessing HIV-related services elsewhere.[29,30]

The inaccessibility of CD4 count testing might also have constituted a barrier. At both hospitals, clients had to attend before 11 AM on one specific morning per week to have their blood drawn for a CD4 count. Even after the introduction of daily CD4 testing in Naivasha in January 2010, an additional visit to the hospital for their CD4 count blood-draw was still required because women were unable to complete PMTCT services until after the 11 AM deadline at the laboratory.

Making CD4 count testing free and feasible on the same day as HIV diagnosis might increase uptake and promote retention in care, especially for women who are still asymptomatic. This could be achieved through point-of-care CD4 count testing. As an alternative, some facilities in Kenya use stabilization tubes (that enable prolonged storage of samples[31]) and draw blood for CD4 count testing at the time of diagnosis, so the CD4 count result is available at the next hospital visit (J. Ong'ech, MMed, MPH, written communication, August 2011).

Studies in other settings have shown that integrating CD4 count testing and initiation of HAART into antenatal services can facilitate women's uptake of CD4 count testing and, if required, HAART during pregnancy.[14,21,32] This should be considered wherever staffing and infrastructure allow. Other health system interventions designed to maximize retention in care for pregnant women with HIV have included: pregnant women bypassing queues at HIV services; paying trained staff to work overtime so as to extend the hours of available services; task shifting; training new cadres of health workers such as lay counselors to provide additional counseling to newly diagnosed clients; and peer escorts by women who have recently used PMTCT services.[18,33–35]

Given the multiplicity of factors identified as affecting women's pathways to care, a range of interventions within each hospital will be required to minimize attrition at different points along the PMTCT cascade.

LIMITATIONS

This study is based on data from 2 government hospitals that do not constitute a representative sample of health facilities in Kenya. Although efforts were made to select hospitals without disproportionate external assistance, for example, from nongovernmental organizations, the generalizability of these findings may be limited.

The limitations of relying on routinely collected hospital data are well known.[36] There was a high proportion of missing data for certain variables, and there was the possibility of misrecording of data.

CONCLUSIONS

A striking level of attrition was identified between testing HIV positive in pregnancy-related services and accessing HIV-related services in the study facilities. Only 4% of women estimated to need HAART in each hospital initiated HAART within 6 months of their HIV diagnosis. Women who only attended pregnancy-related services once had the lowest odds of registering at the HIV clinic highlighting the challenges associated with providing longitudinal care in the context of low uptake of services that may result from high population mobility. Innovation in service delivery is required to improve women's access to services.

Further research is needed to better understand the broad range of factors affecting women's decisions to access HIV-related services. These might include women's experiences of health services, stigma related to an HIV diagnosis in pregnancy, levels of social support, and competing priorities.

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