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Predictors of Attrition from Care and Treatment Centres among HIV-positive Pregnant and Breastfeeding Adult Women in Dar es Salaam, Tanzania

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Abstract

In Tanzania, poor retention rates among pregnant and breastfeeding mothers continue to be a problem, contributing to a mother-to-child HIV transmission rate of 11% in 2019, compared to a global target of 5%. The goal of this study was to determine the influence of retention on clinical outcomes and identifying predictors of attrition among HIV-positive pregnant and breastfeeding women from follow-up care in Dar es Salaam. A retrospective cohort study included HIV-positive women who engaged in PMTCT services in public and private health facilities between January 2016 and December 2019. Secondary data were extracted from databases used for routine follow-up in care and treatment clinics (CTCs). The estimates of cumulative incidences of poor retention from date of enrollment or ART initiation were assessed using Kaplan–Meier method. The Cox regression model was used to identify the predictors of attrition. Among 20,225 HIV-infected pregnant and lactating women enrolled in PMTCT services, 93.35%, 89.07%, and 85.24% were classified as retained in care at 12, 24, and 36 months, respectively. The attrition rate at the end of the follow-up period was 15.82%, and WHO clinical stages 3 or 4 (aHR = 1.67, 95% CI: 1.46–1.89; *p*-value < 0.001) and unsuppressed viral load (aHR = 3.79, 95% CI: 3.20–4.49; *p*-value < 0.001) were predictors of increased risks of attrition. The maternal age group 25–34 years (aHR = 0.24, 95% CI: 0.18–0.32; *p*-value < 0.001), being married or cohabiting (aHR = 0.45, 95% CI: 0.38–0.55; *p*-value < 0.001), an efavirenz (EFV)-based regimen (aHR = 0.26, 95% CI: 0.19–0.35; *p*-value < 0.001), and good adherence to ART (aHR = 0.61, 95% CI: 0.48–0.79; *p*-value < 0.001) were factors associated with reduced risks of attrition. The study shows that a strong tracking system for lost to follow-up (LTFU), that is, patients who miss appointments to the same health facility for more than 3 months after the last scheduled clinical visit, should be prioritised for successive PMTCT programmes for better clinical outcomes.

Keywords: Retention, Attrition, Treatment, Clinics, Loss-to-follow ups.

Introduction

Since 2001, significant progress has been made in providing pregnant and lactating women with more effective and simple antiretroviral (ARV) regimen to prevent human immunodeficiency virus (HIV) transmissions from mothers to children while also improving their personal health. In 2013, WHO recommended Option B+ in developing countries. Option B+ provides HIV-positive pregnant women with lifelong ART regardless of CD4 count levels or disease stage (WHO 2013).

Retention is critical for lowering morbidity and mortality, avoiding new infections, and achieving viral suppression (Cohen et al. 2011). However, poor retention in HIV care has been reported in many African countries (Fox and Rosen 2010). According to a report by Fox and Rosen (2010), the adult people living with HIV (PLHIV) population's retention rate may fall below 50% five years after initiating antiretroviral therapy in sub-Saharan Africa. According to studies, many HIV-infected women who get care during pregnancy are lost to follow-up during the postpartum period (Adams et al. 2015). Prevention of mother-to-child transmissions (PMTCT) interventions improves not only maternal survival but also protects HIV-exposed children from infections and reduces infant morbidity and mortality (Becquet et al. 2012). In this context, women's retention in care during pregnancy and the mother-infant pair's retention in care during breastfeeding are critical to ensure important PMTCT milestones like rapid maternal viral control before delivery, early infant diagnosis (EID), testing at 6-8 weeks, and final HIV infant testing at 12–18 months post-partum (Myer and Phillips 2017). Poor retention can undermine the planned successes of the PMTCT programmes in a number of ways. Low levels of retention, according to Nachega et al. (2012), are one of the primary reasons for virologic failure and MTCT. Women who do not achieve viral suppression may develop symptomatic HIV illness, increasing the risks of HIV transmissions to uninfected sexual partners and infants through breastfeeding (Baroncelli et al. 2015). So, it is important to figure out how to measure PMTCT retention in care and talk about what it means for clinical outcomes.

Attrition from ART care programmes has been high in many countries, with patient loss to follow-up (LTFU) cited as a major factor (Bekolo et al. 2013). According to a study by Geldsetzer et al. (2016), a substantial percentage of women are dropped along the PMTCT cascade in sub-Saharan Africa, which varies for different PLHIV groups. LTFU continues to be a key barrier to successful PMTCT programme outcomes. For example, among women receiving PMTCT services, LTFU range from 19% to 89%, and among HIV-positive children, it is 22% (Leroy et al. 2013). Those who start ART during pregnancy are more likely to stick with PMTCT treatment than women who start later in the nursing process. These breastfeeding women are at higher risks of mother-to-child transmissions (MTCT) in the absence of early ART, as the risks of HIV transmission during pregnancy and delivery might be as high as 40% in the absence of ARVs for PMTCT (Liu et al. 2017). While the researches on postpartum retention are limited, according to Phillips et al. (2014), roughly 25 to 50% of women taking ART at birth may drop out of care during the postpartum period, depending on the setting and follow-up length. The higher risks of HIV-related morbidity and mortality, HIV infections, progression of HIV to AIDS, development of ART drug resistance, or infections of others with resistant HIV strains, high percentage of attrition rates from PMTCT services are problematic (Dalal et al. 2008). Non-retention to PMTCT services might have a variety of causes. Some pregnant women are hesitant to take antiretroviral medications because they are healthy, afraid of being exposed or stigmatised (Atanga et al. 2017).

Tanzania has been providing HIV care and treatment services for more than a decade, so understanding the mechanisms of ART retention is important. Retention in care and adherence to ART are important aspects of HIV care that have big impacts on the health outcomes of HIV interventions for people living with HIV and society as a whole. According to studies conducted in several locations in Tanzania, those who test HIV-positive have low connections to care (Sanga et al. 2019). LTFU was reported to be 49% among PLHIV involved in ART care programmes in Tanzania, and it fluctuates depending on the length of time in ART therapy. By the end of their first and third years on ART, around 18% and 36% of PLHIV in Tanzania are reported to be LTFU, respectively. Individual variables such as

severe clinical and immunological illness stages, younger age, malnutrition, low education, depression, and poor psychological support have all been linked to LTFU in Tanzania (Zuniga et al. 2016). The current retrospective study was conducted in order to i) estimate retention in care, ii) assess the impacts of poor retention on clinical outcomes (viral suppression, WHO clinical stage and baseline body weight), iii) determine the magnitude, and iv) identify factors of attrition among HIV-positive pregnant and lactating women enrolled in PMTCT follow-up care in Dar es Salaam, Tanzania.

Materials and Methods

Study design, area and settings

A cross-sectional study design was implemented in a healthcare setting using data collected retrospectively from the CTC2 database. The study included public and private health care facilities in the Dar es Salaam Region that provide services in accordance with national PMTCT guidelines adapted from the WHO.

Population and sample size in the study

Between January 2016 and December 2019, a total of 21,112 HIV-positive pregnant and lactating mothers in Dar es Salaam received PMTCT services in public and private health institutions. The participants were 20,225 HIV-positive pregnant and breastfeeding women (15–49 years old) who were enrolled in PMTCT services and had been on antiretroviral therapy (ART) for at least three months from the date of initiation. However, 887 women were not included in the study since the outcome variable did not take into account their final status.

Variables taken into account

The study's primary outcome variables were attrition (Yes/No) (included patients who were lost to follow up, and those who had stopped ART during the study period) and survival time to attrition (the time that an individual has survived until attrition occurs over follow up period). The independent factors with their respective levels of categories were maternal age (15–24, 25–34, 35–49), marital status (married/cohabiting, single, widowed/divorced), duration on ART (< = 12 months, > 12 months), adherence to ART (good, poor), ART regimen (EFV based, NVP based, others), WHO clinical stage (1, 2, 3, 4), baseline body weight (< 45 kg, 45–60 kg, > = 60 kg), maternal viral load (suppressed, not suppressed), and district of residency (Ilala, Temeke, Kinondoni, Ubungo).

Data collection

The information on patients receiving HIV/AIDS services was gathered from the CTC database, which comprises routinely collected clinical data for PLHIV patients seeking treatment at public and private health care facilities in Dar es Salaam. Once a patient is enrolled in CTCs, vital information about the patient's follow-up is recorded. Individuals were identified by their unique CTC numbers for anonymity.

Data analysis

The data from the CTC database was transferred to Microsoft Excel, where it was checked for completeness, accuracy, missing data, and consistency. Some data were not included in the analysis because the outcome variable did not take into account their final status. For both univariate and multivariate analyses, the Cox proportional hazard regression model was employed to determine the independent risk factors. The values of categorical variables were expressed as percentages, while the values of continuous variables were expressed as medians and interquartile ranges. Frequency runs, cross tabulations, and summary statistics were employed to represent the research population with respect to key factors. To assess the relationships between significant risk factors and attrition, hazard ratios with 95% confidence intervals were used. The guidelines by Hosmer et al. (2008) were used to determine the degree of significance. In the multivariate analysis, all variables with p-values of 0.2 or less in the univariate analysis were included, and adjusted hazard ratios (aHRs) were computed. All variables with p-

values less than 0.05 were considered independent attrition risk factors. Three separate tests (Likelihood ratio, Wald, and Score log-rank) were used to determine the models' overall significance (at p-values of less than 0.05). The three tests are asymptotically similar and can be used with any model that includes a likelihood function. In addition, Kaplan-Meier survival curves were used to assess the impacts of retention on clinical outcomes (viral load suppression, WHO clinical stage, and baseline body weight) in HIV-positive pregnant or breastfeeding women. The log-rank test was used to assess if the two groups' survival experiences (retention vs. clinical outcome) were substantially different.

Results

Between 2016 and 2019, 20225 HIV-positive pregnant and breastfeeding women were followed up. The vast majority (94.1%) of women had good adherence to ART, with 62.6%) on ART for more than 12 months. When compared to younger women, a higher percentage of older women (53%) were enrolled in the PMTCT follow-up care with a median age of 32 years (IQR: 15–38 years). About 64% of the women were married or cohabiting and resided in Ilala district (34.1%). As the most initial ART regimen, more than three-fourths (85%) were administered an efavirenz (EFV) based ARV drug regimen. In addition, 59.1% had higher baseline body weight at the start of the study. In the current study, about 94% of the women engaged in the PMTCT programmes were diagnosed with WHO clinical stage 1 or 2, and 84.3% achieved viral suppression (Table 1).

Table 1: Sociodemographic and clinical characteristics of the study population

Variables	**Total, N (%)**	**Attrition**	
		Yes, n (%)	**No, n (%)**
Maternal age (years)			
15–24	7028 (34.7)	898 (12.8)	6130 (87.2)
25–34	10713(53)	1961 (18.3)	8752 (81.7)
35–49	2484(12.3)	340 (13.7)	2144 (86.3)
Median (IQR): 32 years (15–38 years)			
Marital status			
Married/cohabiting	12943 (64)	2220 (17.2)	10723 (82.8)
Single (unmarried)	6069 (30)	845 (13.9)	5224 (86.1)
Widowed/Divorced	1213 (6)	134 (11)	1079 (89)
Duration on ART			
<=12 months	7569 (37.4)	1462 (19.3)	6107 (80.7)
>12 months	12656 (62.6)	1736 (13.7)	10920 (86.3)
Adherence to ART			
Good	19026 (94.1)	3136 (16.5)	15890 (83.5)
Poor	1199 (5.9)	63 (5.3)	1136 (94.7)
ART regimen			
EFV based	17189 (85.0)	2804 (16.3)	14385 (83.7)
NVP based	2429 (12.0)	321 (13.2)	2108 (86.8)
Others	607 (3.0)	74 (12.2)	533 (87.8)
WHO clinical stage			
Stage 1–2	19015 (94.0)	2844 (15.0)	16171 (85.0)
Stage 3–4	1210 (6.0)	355 (29.3)	855 (70.7)
Baseline body weight			
< 45 kg	1758 (8.7)	288 (16.4)	1470 (83.6)

Variables	Total, N (%)	Attrition	
		Yes, n (%)	No, n (%)
45–60 kg	6519 (32.2)	1035 (15.9)	5484 (84.1)
>= 60 kg	11948 (59.1)	1876 (15.7)	10072 (84.3)
Median (IQR): 65 kg (54–79 kg)			
Maternal viral load			
Suppressed	17049 (84.3)	2070 (12.1)	14979 (87.9)
Not suppressed	3176 (15.7)	1129 (35.5)	2047 (64.5)
District of residency			
Ilala	6891 (34.1)	973 (14.1)	5918 (85.9)
Temeke	5171 (25.6)	804 (15.5)	4367 (84.5)
Kinondoni	5044 (24.9)	1041 (20.6)	4003 (79.4)
Ubungo	3119 (15.4)	381 (12.2)	2738 (87.8)

*Note: Due to missing data, numbers might not always add up to the total.

Retention in PMTCT services and clinical outcomes

Participants in this study were considered. At 12, 24, and 36 months within their facilities, the proportion of women retained in care was 93.35% (18880/20225), 89.07% (18015/20225), and 85.24% (17240/20225), respectively. However, attrition from care was 12.1% for those who were virologically suppressed and 35.5% for those who were not suppressed. Attrition appeared to be lowest in women weighing > 45 kg and highest (29.3%) in those with WHO clinical stage 3–4 (Table 1).

Retention versus viral load

As shown in Figure 1, women who achieved viral suppression (< 1000 copies/mL) had a significantly higher probability of remaining in care than women who experienced virologic failure (>= 1000 copies/mL). (Log-rank Chi-sq statistic = 23.32; df = 1, *p*-value < 0.0001).

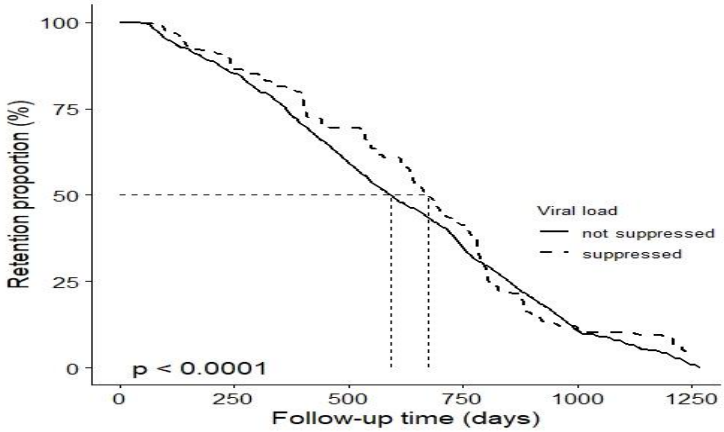

Figure 1: Kaplan-Meier survival curve of retention in PMTCT program by viral load at last measurement.

Retention versus baseline body weight

As shown in Figure 2, women with a higher body weight (> 60 kg) at the start of treatment were more likely to be kept in care than women with a lower body weight (< 45 kg). (Log-rank Chi-sq statistic = 14.15; df = 2, *p*-value = 0.00082).

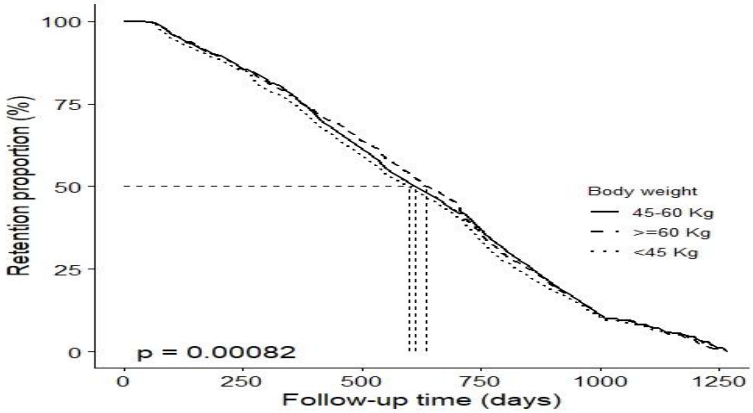

Figure 2: Kaplan-Meier survival curve of retention in PMTCT program by body weight at baseline at initiation of ART.

Retention versus WHO clinical stage

As shown in Figure 3, women in WHO clinical stages 1 or 2 were more likely to be maintained in care than women in WHO clinical stages 3 or 4. (Log-rank Chisq statistic = 28.66; df = 1, *p*-value < 0.0001).

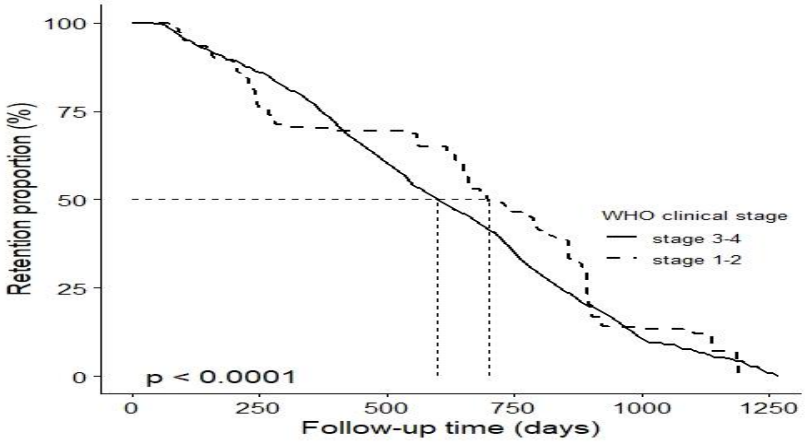

Figure 3: Kaplan-Meier survival curve of retention in PMTCT programme by WHO clinical stage at initiation of ART.

Analysis (Univariate and Multivariate)

All variables (maternal age, marital status, duration on ART, adherence to ART, ART regimen, WHO clinical stage, baseline body weight, maternal viral load, and district of residency) were shown to have significant associations with attrition. Table 2 shows the results of the univariate and multivariate Cox regression analysis.

Table 2: Risk factors for attrition among HIV-positive pregnant and breastfeeding women using Cox proportional hazard model parameter estimation

Variable	Univariate analysis		Multivariate analysis	
	Crude HR (95% CI)	***P-value***	***Adjusted HR (95% CI)***	***P-value***
Maternal age (years)				
15–24	0.72 (0.64–0.81)	< 0.001	0.49 (0.42–0.57)	< 0.001
25–34	Reference	-	Reference	-
35–49	1.01 (0.93–1.09)	0.77	0.69 (0.62–0.78)	< 0.001
Marital status				
Married/cohabiting	Reference	-	Reference	-
Single (unmarried)	0.67 (0.62–0.73)	< 0.001	0.67 (0.60–0.75)	< 0.001
Widowed/Divorced	0.52 (0.44–0.62)	< 0.001	0.78 (0.65–0.94)	0.010
Duration on ART				
<= 12 months	1.36 (1.27–1.46)	< 0.001	0.46 (0.41–0.52)	< 0.001
>12 months	Reference	-	Reference	-
Adherence to ART				
Good	Reference	-	Reference	-
Poor	0.43 (0.34–0.55)	< 0.001	0.46 (0.36–0.59)	< 0.001
ART regimen				
EFV based	Reference	-	Reference	-
NVP based	0.94 (0.84–1.05)	0.288	0.78 (0.69–0.89)	< 0.001
Others	0.55 (0.44–0.70)	< 0.001	0.34 (0.27–0.44)	< 0.001
WHO clinical stage				
Stage 1–2	Reference	-	Reference	-
Stage 3–4	2.03 (1.82–2.27)	< 0.001	1.86 (1.63–2.11)	< 0.001
Baseline body weight				
< 45 kg	0.95 (0.83–1.07)	0.387	0.96 (0.84–1.08)	0.478
45–60 kg	0.89 (0.82–0.96)	0.002	0.92 (0.85–0.99)	0.034
>= 60 kg	Reference	-	Reference	-
Maternal viral load				
Suppressed	Reference	-	Reference	-
Not suppressed	3.60 (3.34–3.87)	< 0.001	6.13 (5.45–6.92)	< 0.001
District of residence				
Ilala	Reference	-	Reference	-
Temeke	0.99 (0.90–1.09)	< 0.001	0.38 (0.28–0.51)	1.00
Kinondoni	1.68 (1.54–1.83)	< 0.001	0.86 (0.75–0.98)	0.028
Ubungo	0.63 (0.56–0.71)	< 0.001	0.27 (0.23–0.31)	1.00

The PH assumption was assessed using the Goodness of Fit (GOF) tests. However, the variables duration on ART, ART regimen, adherence to ART, maternal viral load, marital status, maternal age group, and district of residence, violated (p-value < 0.001) the proportional hazard assumption after adjusting for demographic and clinical factors in a Cox regression analysis (Table 2).

Also, as seen in Figure 4, the curves are not horizontal, implying that the Cox proportional hazard assumption was breached. The current study used the Heaviside function to extend the Cox PH model. The three different tests (Likelihood ratio, Wald, and Score log-rank) were used to determine the overall relevance of the models.

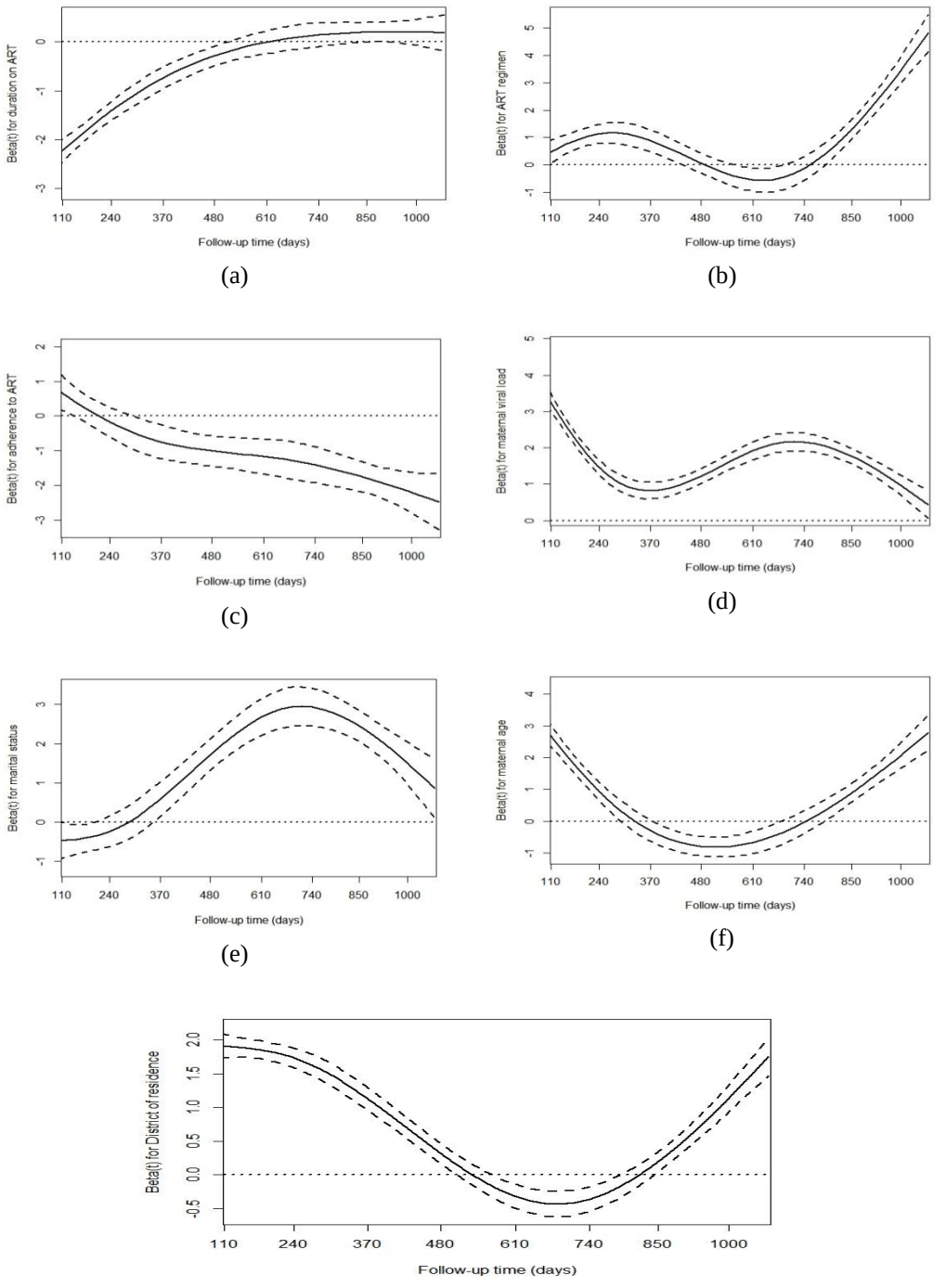

Figure 4: Schoenfeld residual graphs of (a) duration on ART, (b) ART regimen, (c) adherence to ART, (d) maternal viral load, (e) marital status, (f) maternal age, and (g) district of residence.

Table 3: Risk factors for attrition among HIV-positive pregnant and breastfeeding women using extended Cox proportional hazard model parameter estimation

Variable		**Adjusted HR**	**95% CI**	***P*-value**
Maternal age (years)	1 5–24	0.24	0.18–0.32	< 0.001
	25–34	Reference	-	-
	34–49	1.13	0.95–1.34	0.166
Marital status	Married/cohabiting	Reference	-	-
	Single (unmarried)	0.45	0.38–0.55	< 0.001
	Widowed/Divorced	1.02	0.78–1.33	0.882
Duration on ART	<= 12 months	1.04	0.89–1.22	0.634
	>12 months	Reference	-	-
Adherence to ART	Good	Reference	-	-
	Poor	0.61	0.48–0.79	< 0.001
ART regimen	EFV based	Reference	-	-
	NVP based	0.91	0.78–1.06	0.220
	Others	0.26	0.19–0.35	< 0.001
Maternal viral load	Suppressed	Reference	-	-
	Not suppressed	3.79	3.20–4.49	< 0.001
WHO clinical stage	Stage 1–2	Reference	-	-
	Stage 3–4	1.67	1.46–1.89	< 0.001
Baseline body weight (kg)	< 45	0.98	0.87–1.12	0.862
	45–60	0.96	0.89–1.04	0.341
	>= 60	Reference	-	-
District of residence	Ilala	Reference	-	-
	Temeke	0.86	0.68–1.07	0.175
	Kinondoni	1.17	0.93–1.47	0.175
	Ubungo	0.79	0.59–1.04	0.095
Maternal age (years) g(t)	15–24	0.45	0.36–0.56	< 0.001
	25–34	Reference	-	-
	35–49	2.86	2.04–4.03	< 0.001
Marital status g(t)	Married/cohabiting	Reference	-	< 0.001
	Single (unmarried)	2.56	2.04–3.21	0.008
	Widowed/Divorced	0.59	0.40–0.87	< 0.001
Duration on ART g(t)	<= 12 months	0.24	0.19–0.31	< 0.001
	< 12 months	Reference	-	-
Adherence to ART g(t)	Good	Reference	-	-
	Poor	0.73	0.65–0.82	< 0.001
ART regimen g(t)	EFV based	Reference	-	-
	NVP based	0.51	0.37–0.71	< 0.001
	Others	3.20	1.80–5.70	< 0.001
Maternal viral load g(t)	Suppressed	Reference	-	-
	Not suppressed	3.70	3.20–4.49	< 0.001
District of residence g(t)	Ilala	Reference	-	-
	Temeke	0.39	0.29–0.52	< 0.001
	Kinondoni	0.40	0.32–0.51	< 0.001
	Ubungo	0.52	0.38–0.73	< 0.001

Predictors of attrition

Attrition occurred at a rate of 15.82 per 100 person-years on average, with a median follow-up duration of 543 days. The main causes of attrition were loss to follow-up (75.24%) (2407/3199) and transfer-out (20.76%) (664/3199). The predictors of attrition from care are presented in Table 3. The findings demonstrated that the risk of attrition for women with age ranging from 25 to 34 years was 76% lower than for women with younger age (aHR = 0.24, 95% CI: 0.18, 0.32; *p*-value < 0.001). The majority of married or cohabiting women had a 55% lower risk of attrition than single (never married) women (aHR = 0.45, 95% CI: 0.38, 0.55; *p*-value 0.001). Women who had a viral failure (> 1000 copies/ml) had a 3.8-fold higher risk of attrition than their peers (aHR = 3.79, 95% CI: 3.20, 4.49; *p*-value 0.001). In addition, baseline WHO clinical stages 3 or 4 were linked with higher risks of attrition than WHO clinical stages 1 or 2 (aHR = 1.67, 95% CI: 1.46, 1.89; *p*-value < 0.001), according to this study. As compared to their counterparts, HIV-infected women who adhered to their ART treatments had a 39% reduced risk of attrition (aHR = 0.61, 95% CI 0.48, 0.79; *p*-value < 0.001). The majority of women had a dose combination of efavirenz (EFV)-based, which was substantially linked with a 74% lower risk of attrition (aHR = 0.26, 95% CI: 0.19, 0.35; *p*-value < 0.001) when compared to other regimens (ATV/r or LPV/r based). The final multivariate analysis, however, revealed that, duration on ART, body weight at baseline, and district of residence had no associations with attrition.

Discussion

According to Penn et al. (2018), a patient who is still on ART and has not died, been transferred out, ceased treatment, or been lost-to-follow-up is considered to be retained in care. As the PEARL research in Africa and other modelling studies have shown, excellent retention is required at every step of the PMTCT cascade to enhance outcomes (Barker et al. 2011). In this study, the proportion of women retained in PMTCT follow-up care was higher than in studies conducted in Malawi (Haas et al. 2016). Women with viralogical failure (> 1000 copies/mL) had a lower probability of retention than their counterparts (≤ 1000 copies/mL), according to the findings of this study. According to Yehia et al. (2014), the associations between remaining in care and viral suppression vary depending on the severity of the disease. High viral loads increase a person's risk of contracting opportunistic infections, HIV-related stigma, fear of disclosing their status, and other complications (Marzolini et al. 2010, Mukolo et al. 2013). All of these issues have a role in attrition from care or late enrollment into care. Similar findings have been reported in Zambia (Sikazwe et al. 2019), South Africa (Clouse et al. 2018), and Rwanda (Nsanzimana et al. 2019). Women with low body weight at the time of ART initiation had a reduced likelihood of retention. This result is in line with previous studies (Auld et al. 2011). In this study, women in WHO clinical stages 3 or 4 had lower retention than those in WHO clinical stages 1 or 2. This finding is consistent with earlier research (Nsanzimana et al. 2019). Retention and clinical outcomes are comparable, and this suggests that being in poor clinical condition could be a contributing factor to the poor retention rate. Retention in care among HIV-infected pregnant and breastfeeding women is therefore critical to their clinical outcomes and HIV prevention success.

The magnitude of attrition in this study was determined by aggregations of LTFU and discontinuation of antiretroviral medication. In this study, the overall attrition rate was 15.82%, which was lower than the attrition rate in South Africa, where more than a third of women (34.9%) dropped out of one or more levels of the PMTC services (Woldesenbet et al. 2015). LTFU, on the other hand, was discovered to be the leading cause of attrition (75.24%). A similar pattern was reported by Berheto et al. (2014). The lower rate of LTFU (11.9%) in our study could be related to the fact that the majority of the mothers lived in the city, which has the most health care facilities. A huge number of women have a reduced chance of getting care

after leaving their original healthcare facility, which may affect medication adherence (Sikazwe et al. 2019). These factors add to the difficulty of discovering and contacting people who have gone missing.

According to the current study, younger women had a lower risk of attrition than older women. An earlier study in Dar es Salaam, Tanzania, revealed similar results (Siril et al. 2017). The women with virologic failure had a considerably higher risk of attrition than their peers in the final multivariate analysis. Sikazwe et al. (2019) published a similar report. Failure to achieve viral suppression raises the chance of HIV transmissions to an infant through nursing, putting children at risk of perinatal infections (Baroncelli et al. 2015). According to Sikazwe et al. (2019), 71.3% of those who were lost had high viremia compared to those who were retained. In a recent study, attrition was found to be closely linked to advanced disease status at the time of ART commencement. When compared to women diagnosed with WHO clinical stage 1 or stage 2, those diagnosed with WHO clinical stage 3 or stage 4 had a greater chance of attrition. According to this study, women who were married or cohabiting had a lower risk of attrition than single women. Various studies have shown that involving a male partner in a PMTCT programme enhances disclosure, support, and communication, as well as better follow-up outcomes (Delva et al. 2010). Pregnant and breastfeeding women who were prescribed an EFV-based regimen had a lower risk of dropping out of PMTCT programmes than those who were prescribed other regimens (ATV/r or LPV/r).

Conclusion

Because retention and clinical outcomes were shown to be comparable in the study, efforts to evaluate and enhance retention are crucial for successful MTCT eradication. Nonetheless, efforts must be made to ensure that HIV-infected pregnant and breastfeeding women seek medical attention and begin treatment before their conditions worsen, in order to improve clinical results. In addition, the most common reason for attrition was failure to follow-up. So, lowering attrition requires tracing loss to follow-up via a strong tracking system with reliable contact information and unique identities, such as the recently established National Identity cards.

Competing interests

The authors declare that the publication of this paper does not interfere with their personal interests.

Ethical consideration

The University of Dar es Salaam Ethics Committee provided ethical clearance approval. In Dar es Salaam, official permission letters came from the offices of the regional administrative secretary (RAS), the district administrative secretary (DAS), and the office of the district medical officer (DMO).

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