Determinants of Retention on the Prevention of Mother-to-Child HIV Transmission (Option B+) in Cameroon

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Abstract

Background: Current guidelines on the prevention of mother-to-child transmission (PMTCT) of HIV among infected-pregnant/breastfeeding women aim at improving access to lifelong antiretroviral therapy (ART) for every HIV-positive mother in order to eliminate MTCT (eMTCT) while keeping them alive. In this light, assessing the effectiveness of option B+ would help in identifying risk factors in high-priority countries. The aim of our study was to assess the determinants of retention of pregnant/breastfeeding women in vertical HIV transmission in the era «option B+» as part of the implementation of the “test and treat” strategy.

Methods: A retrospectively designed cohort study was conducted among HIV-infected pregnant/breastfeeding women enrolled for PMTCT-option B+ in the three major health districts of the city of Douala in Cameroon. Using the hospital PMTCT records and patient files from February 2015 to October 2016, data was collected on the monitoring of women enrolled for PMTCT-option B+ and the outcome of HIV early infant diagnosis polymerase chain reaction (PCR) of their infants at six weeks. Retention rate was evaluated at 6, 12, 18 and 24 months on ART, and their determinants were analyzed using SPSS17.

Results: Overall, 688 HIV-infected pregnant/breastfeeding women were enrolled. The mean duration on ART during pregnancy was 20.3 ± 5 weeks, 93% infants were born at term, the mean birth weight was 3124 g and 58% experienced exclusive breastfeeding. Retention on ART at 6, 12, 18 and 24 months was respectively 84.6%, 78.8%, 74.6 and 73.5%. Factors associated with poor retention in PMTCT-option B+ were age <25 years (p<0.0001), residing far from the health facility (p=0.0001), diagnosed following a clinical suspicion (p<0.001), unknown HIV status of the partner (p<0.0001), HIV disclosure during breastfeeding (p<0.04), and WHO clinical stage II/III (p<0.0419). Among 288 infants diagnosed by PCR, HIV positivity was 0%.

Conclusion: In the era of PMTCT-option B+, retention on ART remains below the 90% desired target, and decreases overtime. Improved retention requires targeting young pregnant/breastfeeding women, especially those living far from the health facility, diagnosed postnatally, with a clinical impairment, or without male partner involvement. Interestingly, regardless of ART duration and feeding options, retention in option B+ ensures an effective eMTCT.

Keywords: HIV; Retention in care; PMTCT-option B+; Early infant diagnosis; Cameroon

Nucleic Acid Test; PCR: Polymerase Chain Reaction; PMTCT: Prevention of Mother-to-child Transmission.

Introduction

Worldwide, 80% of pregnant women living with HIV have had access to antiretroviral to prevent HIV transmission to their babies. This increased access to ARVs has resulted in a substantial reduction in the number of new pediatric infections to reach 180,000 children newly infected with HIV in 2017 [1–2]. In the west and central Africa, 48% of pregnant women access antiretroviral for the prevention of mother-to-child transmission of HIV (PMTCT) and the mother-to-child HIV transmission rate is 20.2% [2]. Sub-Saharan Africa with about 70% of the burden of the global epidemic, contains 21 of the 22 priority countries for the elimination of mother to child transmission (eMTCT), including Cameroon [3]. Furthermore, Cameroon is part of the 30 countries accounting to 89% of new HIV infections worldwide and the 10 countries contributing to 75% of new pediatric HIV infections globally [3,4]. Nationwide, Cameroon is still experiencing a generalized HIV epidemic (3.4% [95%CI: 3.1%-4.0%] national prevalence) according to the results of the PHIA study, and the HIV prevalence among women is twice higher (4.8% [95%CI: 4.2%-5.3%]) compared to men (1.7% [95%CI: 1.7%-2.4%]) [5]. Also, the national HIV prevalence among pregnant women is estimated at 5.7%, while the rate of HIV-exposed infants remains above 5% [5–6].

World Health Guidelines (WHO) for PMTCT have evolved since 2001, antiretroviral prophylaxis for HIV-infected pregnant women in resource-limited settings has shifted from Nevirapine single-dose administered (SD-NVP) at the beginning of labor in 2001 to the different options A (dual therapy) and B (triple therapy) during pregnancy according to the immunological criteria in 2010 [7,8]. However, these options have encountered several implementation problems, due to a larger extent to varying eligibility conditions of pregnant women and limited access to the CD4 count in health facilities, thus limiting access to PMTCT [8–9]. As part of these programmatic challenges, the revised WHO guidelines on PMTCT recommended in 2013 that lifelong ART is used for all HIV-positive pregnant/breastfeeding women, regardless of their CD4 count or clinical staging, known as PMTCT option B+ [10–11].

The option B+ for PMTCT was approved in Cameroon in December 2014 as part of the “test and treat” strategy. Considered as a public health approach with significant impact for resource-limited settings (RLS) having a high HIV prevalence of [12–14].
However, PMTCT programs often experience difficulties with a loss to follow-up (LTFU) throughout the PMTCT care cascade [9,14]. The PMTCT cascade involves the provision of lifelong ART to pregnant/breastfeeding women, administration of antiretroviral prophylaxis and safe feeding practices for infants, early infant diagnosis of HIV (EID) [15–17]. Regarding the current 90-90-90 treatment targets, retention in the PMTCT cascade requires that at least 90% of HIV-infected pregnant/breastfeeding women continue to receive lifelong ART in order to reduce the number of new HIV infections in children and maternal morbidity/mortality [16–18]. In several studies, the overall rate of retention with option B+ in the context of PMTCT after 12 months of antiretroviral therapy was like that of the national ART program (77%); the majority of those lost to follow-up occurred within the first three months after initiation of antiretroviral therapy [18–21]. However, similar studies in the target population of pregnant/breastfeeding women should be implemented in order to provide evidence for informed public health corrective actions toward closing the gaps in achieving the targets required for MTCT by 2020 [18–20]. Thus, our study aimed to determine the retention rate in PMTCT-option B+ among pregnant/breastfeeding women at 6, 12, 18 and 24 months after starting ART and factors associated with poor retention, then the effectiveness of PMTCT through the outcome of EID.

Materials and Methods

Study Design

A retrospective cohort study was conducted among HIV-infected pregnant/breastfeeding women and their infants enrolled for PMTCT-option B+ during the reporting period from February 2015 to October 2016. Convenient sampling was done in the three major health districts of the littoral region: Deido Health District represented by District Hospital Deido and the Laquintinie Hospital; New-Bell Health District represented by New-Bell District Hospital, and Nylon Health District represented by Nylon District Hospital. These selected health facilities are sites with the highest number of HIV-infected pregnant women in their respective health districts. In each of the above health facilities, HIV-infected pregnant/breastfeeding women and their infants were identified at three major entry points: HIV treatment Centre, the immunization and antenatal care (ANC) units.

Description of the Study Setting

The city of Douala is the economic capital of Cameroon and had an estimated 2,768,436 inhabitants by the end of 2015. The city is in the Littoral region of Cameroon and covers eight out of the 24 health districts of the Littoral region in Cameroon. Thus, the city is a key entry point for HIV infected pregnant/breastfeeding women and their infants entered in the study. The city is in the Littoral region of Cameroon and covers eight out of the 24 health districts of the Littoral region in Cameroon. In this setting, PMTCT-option B+ was launched in February 2015 based on a fixed dose combination consisting of Tenofovir, Lamivudine and Efavirenz administered to HIV-infected pregnant/breastfeeding women. Monitoring of ART was done monthly during the first six months following ART initiation and then every three months thereafter, without active monitoring of pregnant/breastfeeding women on LTFU.

PMTCT Source Documents

In each of the study sites, data were collected from two source documents: the facility PMTCT option B+ ART register and patient files of pregnant/breastfeeding women enrolled for PMTCT-option B+ and their infants. These documents contain information covering the entire PMTCT-option B+ care cascade, covering the HIV status of pregnant woman, date of enrolment into PMTCT, regimen used for PMTCT intervention, delivery mode, infant feeding option, early infant diagnosis (EID) of HIV at six weeks by PCR, HIV testing at 12 months of infancy, HIV testing at 18-24 months of infant age, and the mother-child clinical monitoring. PMTCT database in each site was also used to verify the presence or absence of each pregnant/breastfeeding woman.

Data Collection

The following variables were collected for HIV-infected pregnant/breastfeeding women (age, level of education, occupation, area of residence, marital status, clinical and biological parameters (number of ANC, complications during pregnancy, events of HIV disclosure, moment of HIV serological testing, WHO clinical staging at the moment of ART initiation, date of enrolment on ART, duration of ART during pregnancy, ART regimen, event of treatment discontinuation, duration of discontinuation and reason for discontinuation, delivery mode, infant birth weight, mode and duration of feeding option, and the EID results of HIV. Data was entered into an electronic spreadsheet for cohort constitution following the PMTCT-cascade up to 24 months and then transferred into SPSS 17 for data analysis.

Statistical Analysis

Retention in PMTCT-Option B+ was assessed in the study cohort at 6, 12, 18 and 24 months throughout the PMTCT care cascade. Retention was defined as the proportion of HIV-infected pregnant/breastfeeding women known to be alive and receiving care at their initiation facility relative to the total number of the baseline cohort; LTFU was defined as no clinic visit for >6 months. HIV positivity in infants was defined as any positive result of EID over the total number of available EID results from infants tested.

Data were reported with 95% confidence interval (CI 95%), categorical data were analyzed using Chi-Square or Fisher exact test wherever necessary and quantitative data were analyzed using the Wilcoxon U test; with a p-value < 0.05 considered statistically significant. All variables with a significant p-value in the univariate model were further analyzed by logistic regression adjusting for potential confounders of retention in care.

Ethical Considerations

Ethical clearance was obtained from the Institutional Review Board of the University of Douala prior to the start of the study under No IEC-Ud/964/03/2017/T. Administrative authorizations were equally obtained from the Regional Delegation of Public Health for the Littoral Region and from the administration of the Laquintinie Douala Hospital, New-bell District Hospital, and Nylon District Hospital. Data collection tool was codified for the purpose of confidentiality by using specific codifications, and study findings were returned to participating sites for improved PMTCT performance.

Results

Socio-Demographic Characteristics of the Study Population

PMTCT registers and medical files of 702 pregnant women enrolled on PMTCT-option B+ were retrieved and assessed for study eligibility. Based on inclusion criteria, 14 cases were disqualified due to incomplete information while 688 cases were included, giving an overall rate of 98% (688/702) data consistency. The median age of pregnant/breastfeeding women enrolled in the study was 29 (min-max: 16-43) years, and the age range of 25-35 years represented 60.3% (415/688) of the population studied. Up to 69% (475/688) had a secondary level of education, 55.1% (379/688) were single and 46.5% (320/688) were unemployed.

Regarding the distance from the house to the healthcare center (expressed as the number of taxi drops required to reach the healthcare unit), 63.7% (438/688) lived at one taxi drop from the healthcare center (Table 1).

Clinical Features of the Study Population

Most of the mothers were tested during pregnancy as part of the PTMCT, 90.7% (622/688) including 81.8% who did not know their HIV status at the time of the current pregnancy. Nearly half of the mothers 47.8% (329/688) reported not knowing the HIV status of their partners and 34% of couples were discordant. Clinically, nearly 93% of mothers were asymptomatic at the WHO stage I at enrolment and 98% (674/688) were receiving a fixed dose combination of ARV (tenofovir (TDF), lamivudine (3TC) and efavirenz (EFV)), as shown in table 2.

Rate of Retention in PMTCT Cascade Care

Throughout the PMTCT care cascade, data were available for 688 (6 months), 565 (12 months), 398 (18 months) and 166 (24 months) pregnant/breastfeeding women enrolled in the study. The overall rate of retention in PMTCT care at 6 months was 84.6% (515/688), with decreasing performance overtime: 84.6% after 6 months to 73.5% after 24 months (figure 1).

Determinants of Retention in the PMTCT Care Cascade

Retention according to socio-demographic factors: The rate of retention in PMTCT-Option B+ varied significantly with age groups and the group of mothers younger than 25 years was significantly lost to follow-up (p < 0.001). The retention rate increased with level of education ranging from 65.5% for illiterate women to 83.3% for women with higher education without significant difference (p < 0.25). The retention rate of mothers in care varied significantly (p < 0.0001), with poor performance (60.4%) for those living at far-off distances from the healthcare unit. No statistically significant difference was observed for marital status and occupational activity of the mothers for their retention in care. However, retention appeared slightly higher among married mothers (80%) and unemployed mothers (75.7%), as shown in table 3.

Rate of retention according to clinical events: The retention rate in care at 6 months varied significantly according to the circumstances of HIV discovery (p=0.040); the lowest performance (57.1%) was observed among pregnant/breastfeeding women whose HIV status was discovered following clinical suspicion. This rate differed significantly depending on when the HIV diagnosis was made (p < 0.001); the lowest performance (57.5%) was reported among women diagnosed with HIV during breastfeeding. The retention rate varied significantly with WHO clinical staging (p < 0.0419); poor performance (62.3%) was reported in the group of women classified at WHO clinical stage (II/III). Retention in

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy</td>
<td>622</td>
<td>90.4</td>
</tr>
<tr>
<td>Voluntary HIV testing</td>
<td>38</td>
<td>5.5</td>
</tr>
<tr>
<td>Clinical suspicion</td>
<td>28</td>
<td>4.1</td>
</tr>
<tr>
<td>Moment of HIV diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before pregnancy</td>
<td>125</td>
<td>18.6</td>
</tr>
<tr>
<td>During pregnancy</td>
<td>433</td>
<td>62.9</td>
</tr>
<tr>
<td>At delivery</td>
<td>43</td>
<td>6.3</td>
</tr>
<tr>
<td>During breastfeeding</td>
<td>87</td>
<td>12.6</td>
</tr>
<tr>
<td>Partner’s HIV status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>329</td>
<td>47.8</td>
</tr>
<tr>
<td>Negative</td>
<td>234</td>
<td>34.0</td>
</tr>
<tr>
<td>Positive</td>
<td>125</td>
<td>18.2</td>
</tr>
<tr>
<td>WHO clinical staging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>639</td>
<td>92.9</td>
</tr>
<tr>
<td>II</td>
<td>47</td>
<td>6.8</td>
</tr>
<tr>
<td>III</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>IV</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Antiretroviral regimens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDF/3TC/EFV</td>
<td>674</td>
<td>98.0</td>
</tr>
<tr>
<td>TDF/3TC/NVP</td>
<td>7</td>
<td>1.0</td>
</tr>
<tr>
<td>AZT/3TC/EFV</td>
<td>7</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Table 2: Clinical features of HIV-positive mothers. [3TC: Lamivudine; AZT: Zidovudine; EFV: Efavirenz; NVP: Nevirapine; TDF: Tenofovir].

Figure 1: Retention according to duration in PMTCT cascade.

< 0.0001), with poor performance (60.4%) for those living at far-off distances from the healthcare unit. No statistically significant difference was observed for marital status and occupational activity of the mothers for their retention in care. However, retention appeared slightly higher among married mothers (80%) and unemployed mothers (75.7%), as shown in table 3.

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care was similar regardless of ART duration among pregnant/breastfeeding women (p < 0.294) (Table 4).

**Multivariate analysis of determinants of poor retention into PMTCT**

**Socio-demographic factors associated with poor retention:**
In multivariate analysis, socio-demographic factors associated with poor retention at 6 months were living a far distance from the health facility (OR: 3.2; 95% CI (2.25 - 4.60), p<0.0001), as shown in table 5.

**Clinical parameters associated with poor retention:**
Discovery of HIV status during voluntary testing (OR: 2.43; CI (1.50-3.93), p < 0.0001), unknown partner’s HIV status (OR: 2.13; CI (1.28-3.55), p < 0.003) and WHO clinical staging (II/III) (OR: 1.91; CI (1.06-3.43), p < 0.041) were significantly associated with a risk of low retention in care, as shown in table 6.

**Virologic Outcomes of HIV-Exposed Infants**

**Characteristics of the mother-child population:**
Of the 688 women enrolled in the study (547 pregnant and 141 breastfeeding), 122 were LTFU, 394 were at term with their pregnancy, 336 medical records were available after delivery of which 17 files were incomplete, 4 cases were reported dead and 97 were without HIV EID results, giving a total of 228 infants eligible for the analysis of HIV positivity by EID (see figure 2).

Prior to delivery, maternal duration on ART was 20.3 ± 8 weeks.
Variables | Rate of retention of mothers (%) | [OR] 95% CI | p - value
--- | --- | --- | ---
Age (years) | | | |
< 25 | 66.20 | 1 | |
[25-35] | 77.60 | 0.94 (0.64-1.39) | 0.78 |
>35 | 86.10 | 0.95 (0.51-1.77) | 0.88 |
Level of education | | | |
Illiterate | 65.5 | 1 | |
Primary | 72.9 | 0.70 (0.29-1.68) | 0.43 |
Secondary | 74.7 | 0.64 (0.29-1.42) | 0.27 |
Higher | 83.0 | 0.38 (0.13-1.04) | 0.05 |
Profession | | | |
Employed | 73.9 | 1 | |
Unemployed | 75.6 | 1.3 (0.93-1.87) | 0.69 |
Marital status | | | |
Single | 72.3 | 1 | |
Married | 80.0 | 0.65 (0.39-1.08) | 0.10 |
Concubinage | 76.8 | 0.78 (0.52-1.18) | 0.24 |
Distance to health facility | | | |
1 taxi drop | 83.1 | 1 | |
≥2 taxi drops | 60.4 | 3.2 (2.25-4.60) | 0.0001 |

Table 5: Socio-demographic factors associated with poor retention at six months. [OR: Odds Ratio; CI: Confidence Interval].

Circumstances of HIV diagnosis

| Variables | Rate of retention of mothers (%) | [OR] 95% CI | p - value |
--- | --- | --- | ---
Clinical suspicion | 57.1 | 1 | |
Voluntary HIV testing | 84.2 | 0.25 (0.07-0.78) | 0.018 |
Pregnancy | 75.1 | 0.44 (0.20-0.95) | 0.038 |

Moment of HIV diagnosis

| Variables | Rate of retention of mothers (%) | [OR] 95% CI | p - value |
--- | --- | --- | ---
During pregnancy | 76.7 | 1 | |
Before pregnancy | 80.0 | 0.82 (0.50-1.34) | 0.43 |
At delivery | 76.7 | 0.99 (0.47-2.09) | 0.99 |
During breastfeeding | 57.5 | 2.43 (1.50-3.93) | 0.0001 |

Partner’s HIV status

| Variables | Rate of retention of mothers (%) | [OR] 95% CI | p - value |
--- | --- | --- | ---
Positive | 45.33 | 1 | |
Negative | 81.62 | 0.99 (0.57-1.74) | 0.99 |
Unknown | 67.48 | 2.13 (1.28-3.55) | 0.003 |

Timing of ART initiation

| Variables | Rate of retention of mothers (%) | [OR] 90 | p - value |
--- | --- | --- | ---
[0-7] days | 75.6 | 0.94 (0.59-1.50) | 0.81 |
[8-30] days | 79.3 | 0.76 (0.30-1.91) | 0.56 |
>31 days | 70.6 | 1.22 (0.42-3.53) | 0.71 |

WHO clinical staging

| Variables | Rate of retention of mothers (%) | [OR] 95% CI | p - value |
--- | --- | --- | ---
I | 75.9 | 1 | |
II/III | 62.3 | 1.91 (1.06-3.43) | 0.041 |

Table 6: Clinical parameters associated with poor retention at six months. [OR: Odds Ratio; CI: Confidence Interval; WHO: World Health Organization].
Infant gender distribution was similar: 119 male (52.20%) and 109 (47.80%) females; 58% (133) were on exclusive breastfeeding, 42% on formula feeding and no case of mixed feeding was reported; all infants received Nevirapine prophylaxis for 6 weeks; at the moment of EID, infant mean age was 6.99 (+/-4.36) weeks, and 89% (203) were aged between 6-42 weeks; only 41.2% (95) infants had a regular follow-up after EID results, giving a rate of 58.3% (133) defaults after the first PCR result.

Results of HIV EID and post-natal follow-up: Of the 228 HIV-exposed infants, the first NAT (Nucleic acid testing) performed for EID was negative for all of them, giving a rate of HIV residual vertical transmission of 0% (0/228).

Out of 228 HIV-exposed infants, 50 (22%) had completed their 18-month post-natal follow-up and 78% of the follow-up was still in progress of PMTCT cascade at the time of the study. Among those with a complete follow-up, 25 were tested for the last HIV diagnosis by serology and none of them was seropositive (0%).

Discussion

In this retrospective cohort study, conducted among HIV-infected pregnant/breastfeeding women in the major PMTCT health facilities in the city of Douala, we assessed factors associated with retention in care in the context of eMTCT and the implementation of the “Test and Treat” strategy.

The age range (25-35 years) observed in the study population is consistent with statistics of the National AIDS control program, thus suggesting representativeness of our findings in this target population from EPP-Spectrum and from a study conducted by Billong et al., in Cameroon [22]. Similar trends were reported in Haiti, which therefore address this age range as a priority target for eMTCT [23]. Almost all these pregnant women were educated (96%), a rate that is higher as compared to previous reports (75%). This disparity is because our study was conducted solely in an urban setting while the latter was conducted in both urban and rural settings of the country [23]. Single pregnant women accounted for more than half of the study population. This proportion is higher than reports from Malawi (29%) [24], attributed to the changing sexual behaviors out of wedlock in the current society. Almost half (46.5%) of pregnant women were unemployed, and this is consistent with previous findings (49.7%) while a higher rate was found in Malawi (65%); thus, reflecting the inequity in job accessibility between men and women [25]. As previous reports [24], most of these women were living close to the health facility, indicating the benefits of decentralization in improving access to healthcare.

HIV status was mainly discovered during antenatal care (ANC), confirming the relevance of routine screening during ANC, in the delivery room, and during vaccination. In addition, only a few of them (18%) already knew their HIV status, far from the 58.4% observed in a West African country (Burkina Faso) [26]. Pregnancy was the main motivation for HIV testing (62.9%) and ART initiation (80%) compared to breastfeeding women (12.6% vs. 20%), which is consistent with initiating ART in the era of option B+ in the context of Malawi respectively (88% and 12%, respectively) [25]. Almost all women were asymptomatic (WHO I clinical stage), due to the application of the “test and treat” strategy with option B+ [18]. About half (48%) did not know the HIV status of their partners and up to 34% were serodiscordant couples. A similar trend was reported by Carmone A, et al. and by Clouse K, et al. (44% and 52% with unknown partner status) [27-28], this could be attributed to fear of HIV disclosure, persisting stigma and discrimination [27-28].

About 75% of participants were retained into PMTCT care cascade during the study period, similar to the performance of 78% found in Malawi [25] against lower rate (60.4%) of retention in care was found in the general population of treated patients in Cameroon at 12 months at ART [29], this underscores the benefits of PMTCT on adherence to ART. Nonetheless, the rate of retention remains far below the target of 90%, which therefore prompts the need to identify underlyling factors to improve the PMTCT program in the region.

According to duration in care, retention rate varied from 94.60% (sixmonths) to 7.35% (24 months). Rasschaert et al. found similar trends in Zimbabwe (retention of 84-77% from 6-18 months) [30]; as well as Haas AD, et al. at 2016 in Malawi (77-71% from 12-24 months) [31]. According to age, retention varied significantly, with the lowest performance (66.5%) among those aged <25 vs 86.10% for those aged >35 years. Mitiku I, et al and Dzangare J, et al. respectively in Ethiopia and Zimbabwe, found similar outcomes among young pregnant women [32–33]. This highlights the effect of age of maturity on adherence to “option B+ as part of the test and treat strategy”. Retention in care for ART follow-up of HIV-infected pregnant/breastfeeding women increased with age. Retention into PMTCT Option B+ revealed that similar rates across different levels of education, as also reported by Mitiku I, et al. in Ethiopia [32]. Thus, the educational level of HIV-infected women might not play a significant role in their adherence to PMTCT program. Rates of retention into PMTCT were similar regardless professional occupation, as previously observed in Malawi by Tweya H, et al. [25]. Because these women are generally small-scale and seasonal traders, the local instability in their financial conditions does not give room for a thorough appraisal. Similar rates of retention were also observed across different marital status, likely due high rate of single women as previously shown in Haiti [23].

A significant poor rate of retention was reported among women living far from the healthcare Centre (p < 0.0001), which is largely due to lack of transport fares in the fear of discrimination when attending PMTCT at a nearby Centre. This, therefore, calls for need to consider the transfer of clients to their nearest health facility in order to promote adherence to PMTCT and other health-related programs [23]. According to events of HIV disclosure, retention was significantly higher among women diagnosed through voluntary screening compared to those diagnosed during ANC/PMTCT, as previously reported in Malawi [13]. As also reported in Malawi, retention into PMTCT Option B+ cascade was significantly higher among women who previously knew their HIV status as compared to those who discovered their status during pregnancy, delivery [24]. As expected, people who previously know their HIV status are likely to be more compliant to treatment as they have undergone enough preparedness or were previously exposed to ARV prophylaxis. This calls for action when rolling-out recently diagnosed HIV positive pregnant women on option B+ [9].

According to the clinical profile, the rate of retention was significantly higher (p < 0.003) among asymptomatic pregnant women at WHO stage I as compared to advanced clinical stages. Interestingly, Tenthani L, et al. found similar outcomes, likely due to poor treatment outcomes, associated morbidity, and mortality with the advanced clinical staging. Our findings and those from Zimbabwe revealed no association between the retention rate and the moment of ART initiation, while data from Malawi showed a higher rate of retention with longer ART experience [24]. This discrepancy could be due to the varying ART duration between studies.

Though vertically exposed to HIV, almost all infants were delivered on the term, with a normal weight (2500-4000g), through...
a normal delivery mode, and a slightly higher proportion of male babies. These are like reports from other countries (Senegal and Mali) [34–35]. More than half (58%) of the infants were on exclusive breastfeeding, different from previous reports in 2011 when breastfeeding practice was less promoted [22]. This suggests the need to continuously promote the benefit of ARV protective exclusive breastfeeding for maximal use in a context of limited resources. All infants received Nevirapine prophylaxis as per standards, in contrast to varying prophylactic regimens used in Senegal (64.28% on Nevirapine, 9.52% on Zidovudine, 26.19% on triple ARV with (AZT+3TC+NVP)) [9,35]. This suggests the need to ensure standardized practices across these settings [9].

At first Nucleic Acid testing (NAT), the mean age of 7 weeks indicates EID, which was far better than findings from Togo (i.e. mean age of 11 weeks) [36]. The better performance in Cameroon could be attributed to the free and quality services offered within our study settings. HIV positivity at first NAT was 0%, concordant with observations from Senegal (0%), Mali (0%) and other Cameroonian settings (1%) where similar option B+ strategy is being implemented [35–38]. Regarding infant follow-up after first NAT, 41.7% defaulted during the study period, indicating the need to address LTIFU as a major contributor to on-going MTCT.

Conclusion

In the era of PMTCT-option B+ in RLS, retention on ART remains below the 90% desired target, with a decreasing performance throughout the PMTCT care cascade from 6–24 months. Thus, in order to improve the programmatic performance of retention into option B+, health managers should prioritize interventions on young pregnant/breastfeeding women, especially those living far from the health facility, diagnosed during breastfeeding, with a clinical impairment or without male partner involvement in into PMTCT. Interestingly, regardless of ART duration and feeding options, retention of pregnant/breastfeeding women into option B+ resulted to zero cases of HIV infection, which prompts an effective eMTCT in high priority countries and could contribute in achieving the 90-90-90 targets and the millennium development goals.

Authors’ Contributions

Designed the study: CIP, JF and PKN; Data collection and analysis: CIP, AY, SCB and CIP; Results validation and interpretation: CIP, AY, EEH and JF, Drafting of the manuscript: CIP, JF and AY, Manuscript Revised: SCB and PKN, Approved the final version for submission: CIP, JF, AY, SCB and CIP, Results validation and interpretation: CIP, AY, SCB and CIP.

Ethical Considerations

An ethical clearance was obtained from the Institutional review Board of the University of Douala prior to the start of the study under No IEC-UDo/694/03/ 2017/T. Administrative authorizations were equally obtained from the Regional Delegation of Public Health for the Littoral Region and from the administration of the Laquintinie Douala Hospital, New-bell District Hospital and District Hospital Nylon. Data collection tool was codified for purpose of confidentiality by using specific codifications, and study findings were returned to participating sites for improved PMTCT performance.

Conflict of Interest

Authors declare that there is no conflict of interest.

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