Programmatic Challenges in implementing PMTCT option B+ and pediatric HIV care in Malawi

Les défis programmatiques dans l’implémentation de la PMTE Option B+ et de la prise en charge du VIH pédiatrique: une évaluation préliminaire au Malawi

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Abstract

Objective. With high rates of HIV-infection among pregnant women living in sub-Saharan Africa (SSA), risks of mother-to-child transmission (MTCT) remain concerning in spite of current progress. Thus, identifying gaps in the era of option-B+ would generate specific evidence-based interventions.

Methods. A baseline assessment for “SAVE THE FAMILIES FOR AFRICA” project, a retrospective study was conducted throughout 2014 at the Likuni Mission Hospital in Malawi based on performance indicators of the prevention of MTCT (PMTCT) cascade and pediatric antiretroviral therapy (ART) care.

Results. In 2014, 7.5% (199/2658) newborns were vertically exposed to HIV and all HIV-infected mothers (199) received PMTCT intervention. A rate of 40.8% and 55.1% HIV-infected pregnant/breastfeeding mothers were lost to follow-up at six and 12 months, respectively. Amongst infants (6 [IQR: 6-8] weeks) tested for HIV-1 early infant diagnosis (EID), 79.0% (166/210) EID results were withdrawn, with a median turn-around time (TAT) of 36 [IQR: 30-60] days. 82.5% mothers were on lifelong ART 4 weeks before delivery. Infants received cotrimoxazole (100.0%), nevirapine prophylaxis (91.2%) and exclusive breastfeeding (90.8%). HIV-1 MTCT was 2.8% (6/215), with higher age (p=0.07) and longer TAT (p=0.367) among infected-infants. For pediatric ART, dispensing practices and drug supply were excellent (100%), while on-time drug pick-up (69.7%) and retention in care (70.9%) were poor.

Conclusions. Progress in option-B+ and pediatric ART care are encouraging in this SSA setting, but may be hampered by lost to follow-up and poor adherence. Eliminating MTCT and sustaining pediatric ART performance in SSA require a holistic interventional approach for universal access to healthcare.

Résultat. Entre 2011 et 2014, 399 prises en charge ont été réalisées dans le cadre de l’option B+. Dans l’ensemble, les résultats ont montré une performance positive pour la prise en charge pédiatrique, avec une excellente gestion des médicaments et une bonne adhérence à l’ART. Cependant, il est noté un taux d’ÉI de 5.9% et un taux de suivi des enfants de 76.3%. Ces résultats soulignent l’importance de la surveillance et de l’évaluation des interventions dans le cadre de l’option B+. Les défis identifiés pour l’avenir incluent la mise en œuvre d’interventions ciblées pour améliorer la surveillance des enfants et la qualité de l’adherence à l’ART.
INTRODUCTION

HIV among pregnant women in sub-Saharan Africa

Sub-Saharan Africa (SSA) is still facing high burdens of HIV-infection that disproportionately affects women, with higher incidence in the key population of pregnant women (WHO, 2014a; UNAIDS, 2014). Among pregnant women, HIV prevalence ranges from 7.8% in Cameroon (Billong et al., 2015) to 31.7% in South Africa (Woldesenbet et al., 2015), favored by sustained horizontal transmission (WHO, 2014b). In the Malawian context (10.3% HIV prevalence), 59% of infected individuals are women (UNAIDS, 2014), with consequently 68,000 vertical exposures for 16.2% infant infections yearly (UNAIDS, 2013a). Thus, closing existing gaps would help in an effective elimination of MTCT (eMTCT).

PMTCT programs in sub-Saharan Africa

PMTCT interventions entail a cascade of services: antenatal care (ANC) attendance; HIV testing and counselling; antiretroviral provision for all seropositive pregnant/breastfeeding women; safe delivery and infant prophylaxis; safer infant feeding practices; early infant diagnosis (EID); postnatal family planning and mother-child follow-up; HIV rapid-testing (at 12 and 24 months); discharge after month-24 or linking HIV-positive infants/children to care (UNAIDS, 2013a; WHO, 2014c). Interventions have evolved from single-dose nevirapine, option-A, option-B, to option-B+ (lifelong antiretroviral therapy [ART] for HIV-infected pregnant/breastfeeding women, regardless of CD4 count or clinical stage) in several SSA PMTCT high priority countries (WHO, 2013; Edmonds et al., 2015).

Implementation of PMTCT option-B+

By June 2014, about 50% and 100% respectively of the World Health Organization (WHO) HIV focus and Global Plan priority countries have endorsed option-B or B+ (WHO, 2014b). As national programs are transitioning to option-B+, reaching all HIV-infected mothers is key in reducing MTCT to <5% (or even fewer) in breastfeeding and down to <2% in non-breastfeeding populations (Tubiana et al., 2010; UNICEF and BLC, 2012; WHO, 2013). In SSA, option-B+ was first implemented in Malawi in July 2011; followed by 12 other countries as of end 2014 (UNICEF and BLC, 2012; WHO Afro, 2014; Government of Malawi, 2015). In spite of significant benefits recorded with option-B+ in Malawi, MTCT remains non-negligible nationwide, hence underscoring the need to identify programmatic gaps (Kim et al., 2015). As a pioneer in option-B+, the Malawi experience would address state-of-the-art for eliminating MTCT (eMTCT) in several resource-limited settings (RLS).

HIV-1 Early infant diagnosis and pediatric care

A key component of the PMTCT cascade, early infant diagnosis (EID) aims at identifying HIV-1-infected infants for timely ART initiation (UNAIDS, 2013b; Mwendo et al., 2014; Saounde Temgoua et al., 2015). Inopportune, EID is performed in less than half of HIV-exposed infants, which partly justifies the low pediatric ART coverage (WHO, 2014b). As consequence, pediatric ART program (23%, range 21–25%) lags behind that of adults (37%, range 35–39%), underscoring the need of further investigations/interventions, especially in SSA where 90% of the 3.2 million HIV-infected children are living (WHO, 2014a). Evidence-based interventions are therefore needed for universal access to ART (UNAIDS, 2013b).

Gaps in PMTCT option-B+ and pediatric care

eMTCT has several bottle nets, starting from incomplete ANC coverage in RLS (27%–95%), gaps between ANC attendance and delivery in a health facility (4%–45%) and maternal mortality (Berhan et al., 2014). Secondly, poorly integrated ANC/HIV service and community-based interventions affect uptake in option-B+ (Herlihy et al., 2015). Furthermore, the outcome of some mother-child remains unknown within the PMTCT cascade (Rawizza et al., 2015), especially in rural or remote areas (Escamilla et al., 2015; Edmonds et al., 2015).

Study Objectives

As a baseline assessment for “SAVE THE FAMILIES FOR AFRICA” project, we sought to ascertain the rate of HIV-vertical exposure, the effectiveness of PMTCT and pediatric ART care, in a typical RLS in Malawi.

METHODS

Study design

Using a retrospectively design, an assessment was conducted on the effectiveness of PMTCT option-B+ and pediatric HIV care at the Likuni Mission Hospital (LMH) in Malawi.

Site description

LMH is a health facility located 9 km west of Lilongwe (capital of Malawi), with 231 beds capacity for a catchment area of 168,904 inhabitants (mainly low-income farmers, small-scale traders, and sub-urban wage earners) and accessible to an estimate of 978,700 city residents; offering eleven community-health outreach clinics with expanded reach of health services to remote areas (http://www.likunimissionhospital.org/about-us/who-we-are/). With 3,750 expected annual deliveries, ANC and PMTCT services are integrated; ART clinic is operational since 2005, with 5814 patients enrolled on ART by end-December 2014. Based on its geographical context, its socio-economical situation and experience in option-B+, LMH represents a suitable SSA setting to identify gaps in the era of B+ and generate evidence-based interventions for uptake and global eMTCT.

Data collection on PMTCT care cascade

The study-reporting period was January through December 2014. Maternal data were abstracted from ANC registers of 2014 (containing information on ANC attendance; maternal acceptance for HIV testing; maternal HIV results). This observational period was selected was chosen because the service interventions was implemented from 2015 through the SFA programme. Data on HIV-exposed infants/children were abstracted from the EID MasterCards of 2014 (containing
information on maternal ART; infant nevirapine and cotrimoxazole prophylaxes; practice of formula, mixed or breastfeeding; EID result; EID turn-around-time ([TAT]). Briefly, HIV-vertically exposed infants were tested for EID at 6 weeks of age or at the earliest visit thereafter; EID was based on polymerase chain reaction of the Roche Amplicor® HIV-1 DNA test kit version 1.5 using dried blood spots (DBS) from cards, as previously described (Dube et al., 2012).

**Data abstraction for HIV paediatric care**

Data abstracted from the database (ART version 2.0 beta) in 2014 was used to evaluate the performance of pediatric ART care following programmatic and clinic indicators throughout the year 2014 as per the updated WHO HIV drug resistance (HIVDR) early warning indicator (EWI) tools, from EWI1 to EWIs defined as follows (WHO, 2012):

1. **EWI1 (On-time pill pickup):** Percentage of ART children whose prescribed ARV drugs are all picked up on time;
2. **EWI2 (Retention in care):** Percentage of children known to be alive and on treatment after initiation of ART;
3. **EWI3 (No drug stock-outs):** Percentage of months without ARV drug stock-outs;
4. **EWI4 (Dispensing practices):** Percentage of pediatric patients picking up ART without mono or dual ARV therapy;
5. **EWI5 (Virological suppression):** Percentage of pediatric patients receiving ART at the site after the first 12 months of ART and whose viral load is less than 1000 copies/ml.

**Statistical analysis**

An Excel spreadsheet version 2010 was used for data entry and analysis of PMTCT-cascade indicators, while the WHO routine data quality assessment (RDQA) tool was used to analyse the EWIs of pediatric ART monitoring.

Percentage or proportions were calculated as numerator over denominator; factors associated with risks of MTCT and children follow-up were analysed using Fisher’s exact test, with p-value <0.05 considered statistically significant.

Survival rates among pregnant and breastfeeding mothers receiving lifelong ART (option B+) at 6 and 12 months of follow-up, as well as survivals of HIV-1-infected children receiving paediatric combination ART were evaluated by using both ART registers and the official Malawian ART database (ART version 2.0 beta).

HIV-exposed/infected children and HIV-infected mothers who did not return to clinic 90 days after the last scheduled appointment were considered lost to follow-up.

**Ethics considerations**

The study was part of the activities implemented by the LMH and the AVIRALIA foundation, to support PMTCT uptake. Following the retrospective design, informed consent was not required as data were retrieved from source documents, and de-identified for purpose of confidentiality.

**RESULTS**

**Maternal profile within the PMTCT program in 2014**

Acceptance for HIV testing was 100%. A total of 288 ANC attendees were declared seropositive for HIV, of whom 199 delivered in 2014 at LMH.

The number of deliveries per quarter increased overtime (from 531 to 732), similarly to the number of HIV-related deliveries (from 39 to 57), as detailed in Fig.1.

The annual rate of HIV-vertically exposed infants was 7.5% (199 out of 2658 babies delivered in Likuni Mission Hospital), with closely similar quarterly trends: from 7.3% (39/531) in the first Quarter (January-March), 7.7% (46/598) in the second quarter (April-June), 7.2% (57/797) in the third quarter (July-September), to 7.8% (57/732) in the fourth quarter (October-December) (Fig. 1).

**Maternal PMTCT interventions in 2014**

All HIV-infected pregnant women received lifelong ART. Of those with available details, 82.1% (160/195) were on ART before pregnancy and 12.8% (25/195) received late PMTCT interventions (less than four weeks ART or at the onset of labor, due to late HIV diagnosis during pregnancy), as reported in Fig.2.
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Survival rates among HIV-infected mothers enrolled in 2014
Among 78 pregnant and breastfeeding women newly enrolled on lifelong ART (option B+) in 2014, outcomes at 6 and 12 months revealed high rates of lost to follow-up (40.8% and 55.1%, respectively), and only one case of death was reported (Table 1).

Table 1. Survival analysis of mothers enrolled in 2014

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>6-months</th>
<th>12-months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newly enrolled on PMTCT Option B+</td>
<td>71 (100%)</td>
<td>78 (100%)</td>
</tr>
<tr>
<td>Alive and on PMTCT Option B+</td>
<td>34 (59.2%)</td>
<td>34 (43.6%)</td>
</tr>
<tr>
<td>Died after enrollment</td>
<td>0 (0%)</td>
<td>1 (1.3%)</td>
</tr>
<tr>
<td>Lost to follow-up from the cohort</td>
<td>29 (40.8%)</td>
<td>43 (55.1%)</td>
</tr>
</tbody>
</table>

Legend: PMTCT: prevention of mother to child transmission

Performance of HIV-1 early infant diagnosis in 2014 profile of HIV-vertically exposed children
In total, 217 infants (median age: 6 [IQR: 6-8] weeks, min-max: 1-40) were tested for HIV-1 EID throughout 2014. Of them, five were transferred and two did not have EID result available. Among the remaining 210 infants, for 166 (79.0%) EID results were delivered to the mother/caregiver, while 44 were lost to follow-up including two cases of EID HIV-1-positive infants.
The median TAT, from DBS sampling to EID result delivered to mother/caregiver, was 36 days [IQR: 30-60], min-max (20-197); resulting to ≥one-quarter mothers/caregivers withdrawing EID results 2 months after DBS-phlebotomy.
For infant prophylaxis, all (100%) received cotrimoxazole prophylaxis against opportunistic infections, 91.2% received 6-weeks postnatal nevirapine versus 3.2% without any prophylaxis. For infant feeding option, 90.8% were on exclusive breastfeeding while 3.7% had a mixed feeding, indicating risks of HIV acquisition throughout the course of breastfeeding occurring after the first HIV testing around 6 weeks of age. Regarding maternal ART, 82.5% were receiving lifelong ART (i.e. option B+) for more than four weeks before delivery, versus 8.8% late ART initiation, 3.2% without any ART, and 1.4% AZT monotherapy (Table 2).

Table 2. Clinical profile of HIV-vertically exposed children

<table>
<thead>
<tr>
<th>Infant prophylaxis</th>
<th>6 weeks NVP</th>
<th>NVP only at birth</th>
<th>None</th>
<th>Unknown prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage (n)</td>
<td>91.2% (198)</td>
<td>1.9% (4)</td>
<td>3.2% (7)</td>
<td>3.7% (8)</td>
</tr>
<tr>
<td>Infant feeding option</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusive breastfeeding</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Mixed Feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formula Feeding</td>
<td></td>
<td></td>
<td>3.2% (7)</td>
<td>2.3% (5)</td>
</tr>
<tr>
<td>Unknown Feeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage (n)</td>
<td>90.8% (197)</td>
<td>3.7% (8)</td>
<td></td>
<td></td>
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<tr>
<td>Maternal PMTCT</td>
<td></td>
<td></td>
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<tr>
<td>Option B+ (weeks)</td>
<td></td>
<td></td>
<td>(0-3)</td>
<td></td>
</tr>
<tr>
<td>Option B+ (&gt;4 weeks)</td>
<td>(0-3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AZT Monotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown PMTCT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage (n)</td>
<td>82.5% (198)</td>
<td>8.8% (19)</td>
<td>1.4% (3)</td>
<td>3.2% (7)</td>
</tr>
</tbody>
</table>

Legend: Option B+ indicates lifelong triple antiretroviral therapy; AZT: Zidovudine; n: number; NVP: Nevirapine; PMTCT: prevention of mother-to-child transmission.
For clinical outcomes, all infants were reported asymptomatic except one (suspected tuberculosis later not confirmed); while for the nutritional profile showed all infants were reported without malnutrition, even during the known hunger annual season (around August-November).

**HIV-1 MTCT and related features**

The rate of HIV-1 MTCT was 2.79% (6/215) for infants tested and with available DNA-PCR results in 2014. Among these HIV-1-positive infants, 50% of mother-child pairs received interventions with PMTCT option B+ (maternal ART and infant NVP). Moreover, HIV-1-positive infants had a higher median age at EID testing (16 weeks) compared to those uninfected (six weeks, p=0.07) as well as a longer TAT (38.5 days) compared to those uninfected (36 days, p=0.367) (Table 3). This further suggests that for children tested “only early (i.e. around 6 weeks of age)” might have gotten infection later if breastfed.

<table>
<thead>
<tr>
<th>Table 3. Basic characteristics of HIV-vertically infected infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median [IQR] age at EID testing, weeks</td>
</tr>
<tr>
<td>EID Result withdrawal, % (n/N)</td>
</tr>
<tr>
<td>Median [IQR] Turn-Around-Time (TAT), days</td>
</tr>
<tr>
<td>PMTCT history of mother-child pair, % (n/N)</td>
</tr>
<tr>
<td>Maternal ART (&gt;4 weeks) plus infant NVP</td>
</tr>
<tr>
<td>Maternal ART (0-3 weeks) plus infant NVP</td>
</tr>
<tr>
<td>…Maternal ART (&gt;4 weeks), no infant NVP</td>
</tr>
<tr>
<td>Mother-child without any intervention</td>
</tr>
<tr>
<td>Mother-child with unknown PMTCT exposure</td>
</tr>
</tbody>
</table>


**Outline of ART program and pediatric care in 2014**

Throughout the year 2014, 683 people initiated ART, of whom 34.4% (235) pregnant/breastfeeding women and 6.3% (43) children, with only 1.8% (12) aged <2 years old.

**Indicators of Pediatric HIV care and monitoring**

Out of the five indicators (EWI) used to monitoring children enrolled on ART in 2014 (WHO, 2012), EWI3 was not feasible due to inaccessibility to viral load measurement (Table 4).

<table>
<thead>
<tr>
<th>Table 4. Indicators of pediatric ART throughout 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
</tr>
<tr>
<td>EW11 Percentage of ART children whose prescribed ARV drugs are all picked up on time in 2014</td>
</tr>
<tr>
<td>EW12 Percentage of children known to be alive and on treatment after initiation of ART in 2014</td>
</tr>
<tr>
<td>EW13 Percentage of months without ARV drug stock-outs in 2014</td>
</tr>
<tr>
<td>EW14 Percentage of pediatric patients picking up ART without mono or dual ARV therapy</td>
</tr>
<tr>
<td>EW15 Percentage of pediatric patients receiving ART at the site after the first 12 months of ART whose viral load &lt; 1000 copies/ml</td>
</tr>
</tbody>
</table>

Legend: ARV: antiretroviral; ART: antiretroviral therapy.

Out of the four evaluated EWIs, two achieved the desirable performance of 100%: EW11 (no monthly pediatric ARV stock-outs) and EW14 (good dispensing practices of pediatric triple ART). The two other indicators EW11 (on-time drug pick-up) and EW12 (retention in care) indicated a poor performance (EW11: 69.7%; EW12: 70.9%) among those achieving 12 months follow-up (by end-May 2015) after initiation.
Survival analysis of children on ART in 2014
Among children on ART in 2014, 35% (14/40) were lost to follow-up after 12 months of ART initiation, with semester rates increasing from 25% to 45% (Table 5).

Table 5. Outcomes of children newly enrolled on ART with 12 months follow-up in 2014
<table>
<thead>
<tr>
<th></th>
<th>Quarter-1 (N=12)</th>
<th>Quarter-2 (N=8)</th>
<th>Quarter-3 (N=14)</th>
<th>Quarter-4 (N=6)</th>
<th>Total 2014 (N=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alive and on ART</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 (8.4%)</td>
<td>6 (75%)</td>
<td>8 (57.1%)</td>
<td>3 (50%)</td>
<td>24 (60%)</td>
<td></td>
</tr>
<tr>
<td><strong>Died</strong></td>
<td>1 (8.3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (2.5%)</td>
</tr>
<tr>
<td><strong>Lost to follow-up</strong></td>
<td>3 (25%)</td>
<td>2 (25%)</td>
<td>6 (42.9%)</td>
<td>3 (50%)</td>
<td>14 (35%)</td>
</tr>
<tr>
<td><strong>Stopped ART</strong></td>
<td>1 (8.3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (2.5%)</td>
</tr>
</tbody>
</table>

Legend: In bold are lost to follow-up as major challenge in the pediatric ART program.

Further assessment of survival analysis among children achieving 24 months monitoring in 2014 (Table 6) revealed an increased lost to follow-up (46.7%) as compared to those at 12 months monitoring (35%), p=0.25.

Table 6. Outcomes of children newly enrolled on ART with 24 months follow-up in 2014
<table>
<thead>
<tr>
<th></th>
<th>Quarter-1 (N=24)</th>
<th>Quarter-2 (N=10)</th>
<th>Quarter-3 (N=15)</th>
<th>Quarter-4 (N=11)</th>
<th>Total 2014 (N=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alive and on ART</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 (50%)</td>
<td>03 (30%)</td>
<td>08 (53.3%)</td>
<td>05 (45.4%)</td>
<td>28 (46.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Died</strong></td>
<td>00 (0%)</td>
<td>01 (10%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td><strong>Lost to follow-up</strong></td>
<td>10 (41.7%)</td>
<td>05 (50%)</td>
<td>07 (46.7%)</td>
<td>06 (54.6%)</td>
<td>28 (46.7%)</td>
</tr>
<tr>
<td><strong>Transfer out on ART</strong></td>
<td>2 (8.3%)</td>
<td>1 (10%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>3 (5%)</td>
</tr>
</tbody>
</table>

Legend: In bold are lost to follow-up as major challenge in the pediatric ART program.

**DISCUSSION**

The present study is an appraisal of PMTCT performance and the quality of paediatric HIV care, in order to generate baseline findings for specific interventions.

The high acceptance of HIV testing during ANC is encouraging, and was due to counseling on the benefits of PMTCT (Billong et al., 2015; Tenthani et al., 2015). Increasing access to ANC would scaled-up PMTCT coverage (Ladner et al., 2015). The 2,658 reported deliveries, out of 3,750 expected (~29.1% gap), suggest inaccessibility to ANC and ongoing risks of HIV-vertical transmission (WHO Afro, 2014; Woldersenbert et al., 2015). Since home deliveries have greater risk of infecting the child, wider ANC coverage is needed in the community.

The lifelong ART, largely provided to HIV infected pregnant and breastfeeding mothers, confirms option B+ implementation in Malawi (WHO Afro, 2014; Herce et al., 2015). However, efforts to limit late ART initiation (i.e., ~13%) are needed for PMTCT (Tenthani et al., 2015), including fully integrated ANC/PMTCT services (UNICEF, 2009; Billong et al., 2015; Herlihy et al., 2015).

The increasing rate of mothers lost to follow-up underscores the relevance of continuous adherence counseling throughout PMTCT-cascade-care (Tweya et al., 2014), especially for those with higher CD4 (Giuliano et al., 2015), living in distant communities (Horwood et al., 2015), or experiencing local barriers to adequate healthcare (Uwimana et al., 2012; Tilahun et al., 2015; Osoti et al., 2015).

Low rate of maternal mortality, in the frame of lifelong ART, suggests greater health benefits while scaling-up option B+ and limiting defaults from PMTCT-cascade (Tweya et al., 2014; Kim et al., 2015).

Regarding EID, about 75% were PCR-tested at the recommended age (6 weeks), indicating good practices at LMH. However, with 31% EID results not picked-up, counseling mothers/caregivers on the relevance of infant HIV status would improve best PMTCT practices locally (McCollum et al., 2012).

Low rate of MTCT (<5%) indicates effectiveness of PMTCT-interventions: option B+ (91.3%), infant nevirapine (91.2%), and exclusive breastfeeding (90.8%), as earlier reported (Mwendo et al, 2014; Saounde Temgoua et al., 2015; Kim et al., 2015).

Children were all reported asymptomatic, likely due to the protective effect of cotrimoxazole against opportunistic infections (Revill et al., 2015) and the absence of children reported with malnutrition (Chitere et al., 2015).

As half of HIV-1-positive infants received effective PMTCT-interventions (maternal ART and infant NVP), further investigations would help in mitigating risks of MTCT with adherence-levels, virological response and emerging drug resistance (Rawizza et al., 2015; Wadonda-Kabondo et al., 2012; Palombi et al., 2015).

The higher age at EID testing and a longer TAT, reported among HIV-1-infected infants, suggest poor adherence, supported by the high rate of defaults from the PMTCT cascade-care (Kim et al., 2015; Tejiokem et al., 2015).

Regarding pediatric ART care, ARV dispensing practices were adequate to recommended guidelines (likely favored by fixed dose combinations). No ARV stock out indicates a functional drug supply mechanism. However, delayed pill pick-up and poor retention on ART represented major early warning indicators of HIVDR emergence, thus supporting adherence counseling to mitigate lost to follow-up (Billong et al., 2012; Billong et al., 2013; Bigna et al., 2014; Fokam et al., 2015; Woldesenbet et al., 2015).
Assessing the role of viral load as an indicator was not feasible. However, implementing viral load testing is crucial for effective monitoring of ART response (Fokam et al., 2011) and PMTCT interventions in such RLS, using a holistic intervention (Teerawattananon et al., 2014).

CONCLUSION

Despite considerable HIV vertical exposure in this Malawian context, MTCT appears below the target of 5%. However, the high rate of lost to follow up, the low rate or lack of testing after breastfeeding, etc, limit the breadth of observations. Thus, in an era of option B+, continuous PMTCT interventions are required to limit the rate of defaulters/lost to follow-up. Though pediatric ART program is highly operational (standard regimens and constant drug availability), there are needs to implement viral load testing for HIVDR prevention.

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CONFLICT OF INTEREST

Authors declare there is no potential conflict of interest related to this work.

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