

Prevention of Mother-to-Child Transmission (PMTCT) of HIV in Karongi District, Rwanda: A Success Story

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ABSTRACT

INTRODUCTION: Prevention of mother-to-child transmission (PMTCT) is a key strategy in programs aiming to prevent HIV transmission from mother to child. Rwanda adopted this program since 2010 and scaled it up in all public health facilities including health centers (HCs). Over all, Karongi District hospitals and its health centers recorded consistent decreases of HIV transmission rates from mothers to children. This article assesses and summarizes Karongi's success story.

METHODS: Data were abstracted from routine Health Management Information System (HMIS) for the period between July 2010 to June 2019. The target population was women attending PMTCT services. Data analyses we preformed using excel and proportions were presented. The outcome of interest was the proportion of infected children born to HIV-positive mothers.

RESULTS: A total of 92,366 pregnant women attended PMTCT services in Karongi District, from 2010-2019. A proportion of 83.5% of them were accompanied by their husbands for PMTCT services. The HIV prevalence among pregnant women attending ANC services decreased from 2.7% in 2010 to 0.3% in 2019; the rate among sub-districts varied between 0.011% in 2010 and 0.003% in 2019. Kibuye sub-district recorded the highest number of HIV-positive women from 2010 to 2019 (460). During labor, in the study period, 45,118 pregnant women attended maternity services in Karongi District; among them 113 (0.25%) had HIV-positive tests. One HIV transmission was registered in 2019. From 2010, among exposed infants, 22 have been HIV-infected through MTCT at 8 weeks or 18 months. The transmission rate in 2019 (a single case), for the considered period, was 0.12%.

CONCLUSION: PMTCT succeeded in Karongi District. This success of elimination of HIV transmission from mother-to-child should be sustained. In this context, HIV-free generation can be expected.

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INTRODUCTION

Human Immunodeficiency Virus (HIV) is a Sexually Transmitted Infection (STI), that can also be transmitted from mother-to-child during pregnancy, delivery and/or breast feeding. Globally, vertical HIV transmission contributes to 9% of HIV new infections [3]. In breastfeeding

population, this transmission can be reduced to less than 5% and less than 2% in non-breastfeeding population [3]. The mother to-child transmission of HIV is public health problem, but with sustained and coordinated efforts, infections acquired through this transmission route can be averted. On the other hand, without intervention the MTCT of HIV was estimated at 5 to 20% [1] but WHO

estimated the risk of MTCT from 15-45% [2]. Antiretroviral treatment (ART) reversed the trend of MTCT among women having this treatment. The idea of elimination through MTCT is possible if the coverage of ART among pregnant women is increased and sustained. The World Health Organization initiated the program to eliminate mother to-child transmission of HIV [3,4]. United Nations General Assembly (UNGASS), through country members, was committed to reduce by 50% MTCT by 2010 assuming that 80% of pregnant women will get ART [4]. Despite invested efforts to eliminate MTCT of HIV, the issue is persisting. In United Kingdom, from 2000-2006, the MTCT rate was estimated at 1.2% [5].

In UK, from 2006 to 2013, MTCT declined from 1.2% to 0.4% [6]. In African countries the HIV-infection through MTCT is still high. For instance, in South Africa, PMTCT assessment reported that 3.5% of infants were infected in 2010, the following year the MTCT of HIV was estimated at 2.7% [7]. In Kenya, a study conducted in PMTCT intervention in 2010 revealed that 5.3% of infants born to HIV-infected mothers were HIV-infected [8]. A previous study conducted in the west of Kenya reported that MTCT of HIV was 8.1% at three months and 14.9% at 18 months [9]. In the same period in Uganda, MPTCT was estimated at 15.5% [10]. Similarly, a systematic review conducted in Ethiopia showed that MTCT of HIV ranged from 4.2% to 15.7% [11].

In Rwanda, remarkable intervention has been implemented in fighting against HIV among pregnant women. Universal coverage of HIV testing and treatment of HIV for pregnant women in antenatal care (ANC) services in the country. The prevalence of HIV among pregnant women attending ANC was 2.4% in 2017-2018 [12]; and in one decade MTCT decreased from 6.9% in 2009 to 1.5% in 2019 [12,13]. There is paucity of data of MTCT of HIV at the scale of district. However, this prevalence was estimated in few health facilities. In Muhima Health Center MTCT transmission was estimated at 11.5% in 2009 [14], a researcher conducted a study in health facilities in Kigali and found that the MTCT transmission rate was 2.2% [15].

Aim

To provide an overview on PMTCT program in Karongi District and its success story.

Objectives

To analyze PMTCT uptake in Karongi District
To analyze and report on the outcome of PMTCT services in the reduction of MTCT in Karongi District over the reporting period.

METHODS

Study design: A retrospective study, using secondary data extracted from the HMIS database at Karongi District level.

Target population: The principle investigator extracted data from an existing database (HMIS) from 2010 to 2019. Analyses were performed on aggregated data; Rwanda's current HMIS does not report patient level data. All reported women who attended PMTCT services, and babies born from those women were reported. The outcome of interest was the number of infected children whose mothers were in the PMTCT program and were infected. An infected child was included in the study regardless their point of infection: during birth or after birth (e.g.: might have acquired infection during breast feeding). Karongi District has two district hospitals (Mugonero and Kirinda district hospital) and one referral hospital (Kibuye Referral Hospital). Catchment areas of the mentioned hospitals are recorded as sub-districts in HMIS.

Inclusion criteria: All women who attended PMTCT services, and their babies reported from 2010 to 2019.

Sample size: We used a take all approach for the defined study period. A total of 92,366 pregnant women were included.

Data collection data collection tools: The investigator considered two main elements: Pregnant women in ANC with known HIV-statuses, pregnant women in ANC with unknown HIV statuses attending PMTCT services and pregnant women with unknown HIV statuses recipients of maternity services (Figure 1).

We exported data from the HMIS database system to Microsoft Excel for visualization and analysis.

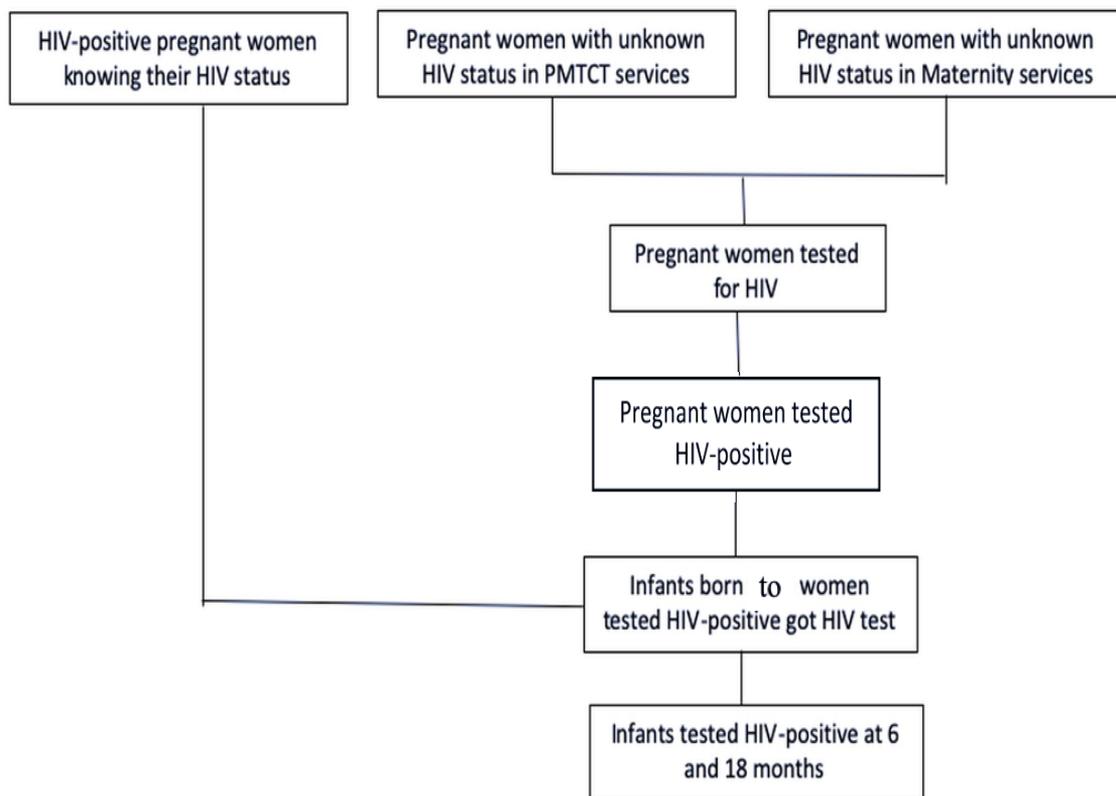


Figure 1: Participants flow to select MTCT HIV transmission

Data analysis: Microsoft excel was used to compute descriptive data analyses. Proportions were presented in tables and graphs.

Ethics considerations: Data was extracted from a routine reporting system, the Health Management Information System (HMIS) and there were no individual level interactions, as well as no personnel information recorded and accessible in the system.

RESULTS

Table 1 below displays the trend of women attending PMTCT services in Karongi District, by sub-districts corresponding to catchment areas of three hospitals in Karongi District. Kibuye sub-district recorded many pregnant women compared to other two sub-districts. The highest number was recorded in 2013 (11,305). The total cumulative number of women in this study was 92,366 women.

Table 1: Pregnant women with unknown HIV status tested for HIV in PMTCT service over time in Karongi District.

Sub-District / Period	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Kibuye	2296	5203	5673	6252	5087	5666	5802	5694	5672	3094	50439
Kirinda	1329	3225	2988	2611	2020	2303	2489	2345	2309	1038	22657
Mugonero	765	1977	2309	2442	1868	2313	2411	2091	2181	913	19270
Total attendees	4390	10405	10970	11305	8975	10282	10702	10130	10162	5045	92366
Total HIV positive	119	118	154	143	61	56	80	39	45	16	831
Total HIV prevalence	2.71	1.13	1.40	1.26	0.68	0.54	0.75	0.38	0.44	0.32	NA

For the mentioned period, the cumulative HIV prevalence was 0.90%.

Data in table one shows that the trend of HIV prevalence in the mentioned study period was on a considerable decrease from 2.7% in 2010 to 0.3% in 2019.

Overall, the number of pregnant women attending ANC services who tested positive for HIV

infection decreased from 2010 to 2019. Kibuye sub-district recorded the highest number of HIV-positive pregnant women from 2010 to 2019 (460), while Mugonero sub-District recorded the lowest number (160). In total 831 HIV-positive pregnant women were recorded in Karongi District with an observed peak (154 positive cases) in 2012 (Figure 2).

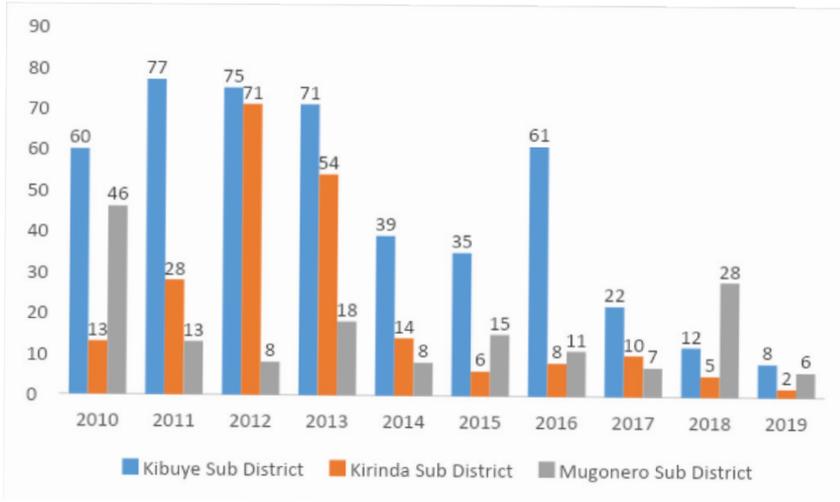


Figure 2: Pregnant women tested HIV positive in PMTCT services over time in Karongi District

The figure 3 shows numbers of pregnant women who attended PMTCT services during labor in the three sub-districts. Overall, Kibuye sub-district had the highest number of attendees. From 2014, Mugonero sub-district had slight raises although not at the level of Kibuye Hospital. In the same year, Kirinda showed constant levels with small rises in 2017.

The lowest number of pregnant women tested for HIV during labor dropped down in 2014.

In the designed period, 45,118 pregnant women

attended maternity services during labor in Karongi District, among them 113 (0.25%) became HIV-positive (Figure 3).

At 6 weeks or 18 months, from 2010, among exposed infants, 22 were HIV-infected through MTCT. The transmission rate for the whole period was 2.65%. In the last five years, the transmission rate was 0.00% except one case of HIV transmission over 831 HIV-positive pregnant women (0.12%), recorded in 2019.

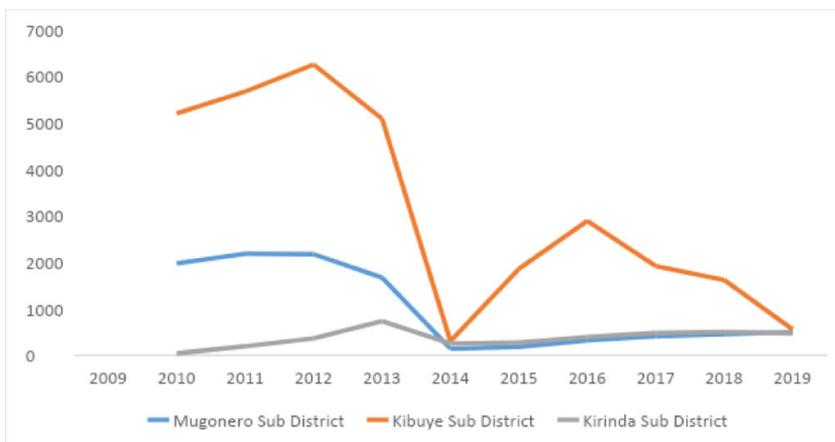


Figure 3: Number of women with unknown HIV status tested for HIV during labor in Karongi District over time

DISCUSSION

In Rwanda, all public Health Centers and all hospitals are involved in PMTCT program; test-and-treat approach is used and appropriate prophylaxis to newborn [22]. The total number of pregnant women attending ANC services was high in the last decade. Pregnant women are systematically encouraged to attend ANC and PMTC (where applicable) services and they are also requested to deliver at a health facility. Data were abstracted from a decade back from pregnant women attending PMTCT and maternity services in Karongi District.

From 2015 to 2018, there was no single MTCT, the transmission rate was 0.0%. In 2019, one MTCT over 97 newborns (1.0%) was recorded. This is a big achievement compared to expected MTCT HIV transmission without intervention (15-45%) [3]. This MTCT prevalence reported in this assessment is lower compared to MTCT national findings reporting a prevalence of (1.9%) [12]. The purpose of PMTCT program is to avert the transmission of HIV infection from a pregnant woman to child. The success of this program depends on administering ART to all HIV-positive pregnant women. The PMTCT intervention was the major factor to reduce MTCT in Karongi District [13].

Kibuye sub-district has the biggest number of attendees due to its catchment area. It covers many HCs, and major urban settings, whereas, the remaining sub-districts (Kirinda and Mugonero) are totally rural. This could explain why the number of pregnant women registered in Kibuye sub-district is higher compared to Mugonero and Kirinda sub-districts.

There is an apparent decline of HIV among pregnant women (from 2.7% in 2010 to 0.3% in 2019). The decline of HIV among pregnant women could be attributed to the low prevalence of younger women (less than 24 years) compared to older pregnant women (older than 24 year) [17]. This prevalence is much lower compared to the national prevalence of HIV among pregnant women attending ANC services (2.4%) across the country [12]. Our finding is not similar to the general consistent decrease of HIV infections in pregnant women observed and recorded in the African region from 2003 to 2012 [16]: From 4.3% to 2.9% in the West African region, From 3.6%

to 2.9% in the East African region and 17.3% to 16.1% in Southern Africa [16]. The main factor of the general decline of HIV among pregnant women could be the scaling up of HIV treatment and increased awareness of HIV prevention.

The HIV prevalence among pregnant women in Karongi District is a bit lower (0.3%) compared to HIV prevalence for the same population at Muhima Hospital, Kigali, Rwanda; 3.7% and 3.2% at 6 weeks and 6 months respectively [14]. For instance, in Tanzania from 2002 to 2011, it declined from 5.6% to 4.6% in Kagera region, and from 7.1% to 5.5% for Mtwara [17] while it was 6.9% in Western Kenya [18].

The one MTCT case observed between in 2019 was due to the not up-taking ARTs, and not attending her ANC programs; leading her to a home delivery with no trained birth attendants.

The study used existing routine collected data from an aggregated data source. Some information could not be found in the existing database. We used data collected from a small scale in the country (only one district); lack of similar small-scaled studies did not allow holistic comparisons.

In conclusion, the number of pregnant women tested in delivery room dropped down in 2014 due to new HIV guideline for pregnant women requiring all pregnant women to be tested during ANC visits compared to the former guideline where women were only tested during labor/delivery.

Although the PMTCT program in Karongi District succeeded to consistently reduce HIV MTCT, there is still need for improvement to achieve zero MTCT. This can only be possible through mutual collaborations between health care providers and HIV pregnant women as well as a continuous provision of counseling services among infected HIV women of reproductive age. It is only in this context that a HIV-free generation can be created.

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