

Effectiveness of the Regular Implementation of the Mother to Child Transmission Plus (MTCT-Plus) Program in Burkina Faso, West Africa

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1. Introduction

Since the 90s, many developing countries have introduced health strategies aimed at reducing Mother-to-Child transmission rate of HIV. These strategies (PMTCT – Prevention of Mother-to-Child Transmission) are based on (i) adequate counselling for HIV voluntary testing during antenatal care visits, (ii) single dose or a short antiretroviral therapy treatment to the mother and the newly-born baby (WHO, 2001; WHO, 2004; WHO, 2006) and (iii) formula feeding or (iv) exclusive breast-feeding with early weaning (WHO, 2003a; WHO, 2006).

During the last years, thanks to the increase of the PMTCT program coverage, the aim of the program was enlarged to address the needs of all the family members of the HIV-positive women detected by the program. The World Health Organization (WHO) then introduced the Mother-to-Child Transmission Plus (MTCT-plus) program aimed at promoting health, eventually including the use of Highly Active Antiretroviral Treatment (HAART) for the infected mothers, their children, even those whose father is different from the current partner, and the partners themselves (WHO, 2003b).

Aims of the program are, therefore, (i) to reduce HIV vertical transmission rates through specific antiretroviral therapies for the HIV-infected pregnant women, (ii) to involve a larger number of children and partners in the early stage of the disease and (iii) to increase the children survival rates by improving the HIV-positive mothers' life expectancy. (Berer, 1999; Brahmbatt et al, 2006). Psychosocial and nutritional supports and family planning are also integral components of MTCT-plus activities. Programs also focus on health education, including best breastfeeding practices to reduce transmission risk and nutrition.

Another important expectation of the program is to raise awareness and acceptability of HIV testing and early antiretroviral therapy, thus curbing the incidence of overt AIDS.

Since 2003, many MTCT-plus programs have been implemented in HIV endemic developing countries, yielding conflicting results in different settings (Tonwe-Gold et al, 2009).

In Burkina Faso, where a stable HIV-prevalence of 1.8% is recorded (UNAIDS, 2006), the PMTCT program started in 2002 and the MTCT-plus program was introduced later on thanks to the World Bank (TAP-Treatment Acceleration Program) and the Global Fund funding, which increased the availability of antiretroviral drugs.

Aim of our work is to describe the achievements and the constraints faced by the real-life implementation of MTCT-plus program at the St. Camille Medical Center in Ouagadougou, Burkina Faso.

2. Methods

Study site: St. Camille Medical Center (SCMC) in Ouagadougou, Burkina Faso, a large mother and child health center, where more than 3000 deliveries take place every year (picture 1). Prevention and care of HIV infection have been carried out since 2002 at the center (WHO 2004). Thanks to a collaborative agreement, physicians from the University of Brescia and from the Spedali Civili General Hospital in Brescia (Italy) have been working in the Center to support local staff and anti-HIV activities.



Fig. 1. St. Camille Medical Center

Voluntary Counselling and Testing (VCT): VCT is offered at St. Camille Medical Center to all pregnant women during their prenatal visit (opt-in strategy). Counselling involves an individual pre-test and post-test, conducted during the same morning by specially trained

midwives. All women are also asked to invite their partners to undergo the test. Moreover, HIV positive women are invited to test all the children had from previous pregnancies. Should the partner test HIV-infected, possible co-wives are also invited by the partner to undergo the test.

Screening test: after informed consent, serological screening is immediately performed by two sequential rapid tests (Determine® and Genie-II®) (Koblavi-Dème et al, 2001) to avoid loss to follow-up and assure adequate post-test counselling. In case of conflicting results, an additional ELISA test is also performed. Polymerase Chain Reaction (PCR) test, available at the Center, is used to detect infection in young children under 18 months (Simporé et al, 2006).

Patients management and PMTCT protocol: The national guidelines applied by the Center followed the indications provided by WHO during the study period (WHO, 2003c; WHO, 2006) both with regard to PMTCT protocols, and to the indications for therapy and for any immunological assessment.

Nevertheless, until 2006, access to treatment has resulted in waiting lists so that even women in need of therapy have made only prophylaxis in pregnancy, starting HAART after delivery. From 2006 onwards, all women in need of therapy started HAART during pregnancy. Prophylaxis, including the breast-milk substitutes, were provided for free, while for HAART a contribution of 3 USD per month was asked (table1).

	During pregnancy	During delivery	After delivery
Protocol	AZT (300 mg x 2/day from 28° week of pregnancy)	NVP (200 mg single dose) + AZT/3TC (300mg/150mg)	Mother: AZT/3TC (300/150mg x 2/day for 1 week) Newborn :NVP (2mg/kg single dose) + AZT (4mg/kg X 2 / day for 1 week)

Table 1. PMTCT protocols (prophylaxis)

3. Results

From 1st May 2002 to 30th September 2008, 20,040 deliveries took place at SCMC and 4,028 (20.1%) VCT were carried out in pregnant women, with a seropositivity rate of 20.5% (826/4028). These 826 HIV+ pregnant women were enrolled in the PMTCT program.

Only 354 HIV+ pregnant women (42.8%) were enrolled in our MTCT-plus programme while the remaining 472 women were included in other centers' programs according to their living area and centers availability.

Catholic religion was declared by 40.4% of the sample (143/354), while the majority of the sample (185/354, 52.3%) declared to be Muslim, as it is the case for the routine attendance of the Mother-and-Child (MCH) clinic in this predominantly Muslim country.

As to the educational level, 102/354 (28.8%) attended the primary school (including Koranic school), while 35.6% attended the secondary school (126/354). Only 10 women (2.8% of the

sample) attended higher level schools. A remarkable part of the sample (32.8%, 116/354) declared to be illiterate.

As many as 129/354 women (36.4%) could only speak the local language (Mòoré), including 15 women who declared Koranic school. The remaining 63.6% (225/354) could also speak French. Most women were married (246/354; 69.5%), while 77/354 (21.8%) declared to be unmarried, but with a steady partner. The remaining 18/354 (5.1%) declared to be divorced and 13/354 (3.7%) declared to be widows, 3 of whom married again. (Table 2).

	Number	%
Religion		
- Catholic	143/354	(40.4%)
- Muslim	185/354	(52.3%)
- Others	26/354	(7,3%)
Language		
- French and local language	225/354	(63.6%)
- Only local language	129/354	(36.4%)
Civil Status		
- Married	246/354	(69.5%)
- Unmarried (steady partner)	77/354	(21.8%)
- Divorced	18/354	(5.1%)
- Widows	13/354	(3,7%)
Educational Level		
- Illiterate	116/354	(32.8%)
- Primary School	102/354	(28.8%)
- Secondary school	126/354	(35.6%)
- Higher school level	10/354	(2.8%)

Table 2. Description of the female population

After counseling, 182/344 living partners (52.9%) accepted to undergo the test and 115/182 (63.2%) tested positive. Among those partners who did not accept HIV testing, 82/162 (50.6%) were not informed by the woman, 29/162 (17.9%) were informed but refused to undergo the test, while for the remaining 51/162 (31.5%) information was not available.

Polygamic families in our sample had very low acceptance rate to the test (just 1/46 of the co-wives was tested, 2.1%, with negative result).

Out of the 115 HIV-infected partners, only 36 (31.3%) accepted to be followed at the St. Camille Medical Center, while the remaining 79 did not show up anymore.

The average age of our HIV+ patient cohort (390 in total, 354 women and 36 partners) was 32.3 years old (SD \pm 6.3 years old) with a significant difference ($p < 0,01$) between women (31.5 years old) and their partners (40.8 years old).

At the end of September 2008, we counted 647 living children for the women enrolled in the program, considering all the children had before (348, 53.8%) and those delivered in the current and/or in a later pregnancy (299, 46.2%). As many as 249 dead children were also reported with an overall average of 2.5 children per woman.

The 17.8% (63/354) of our pregnant women was at the first pregnancy at the moment of enrollment.

Furthermore, a significant proportion of pregnant women (48/354) declared not having other living children due to the negative outcome (abortion) of previous pregnancies or to the death of previous children.

HIV testing was carried out in 186/348 (53.4%) children had from previous pregnancies, with a HIV prevalence rate of 10.2% (19/186) and in 231/299 children delivered under the PMTCT program, with a HIV prevalence rate of 4.3% (10/231). In our study, we did not observe any neonatal infection from that sub-set of mother who underwent HAART during pregnancy after 2006 (Simporé et al, 2007).

Out of the 29 HIV infected children, 20 are currently followed at the St. Camille Medical Center, 4 are followed by other centers and 5 are lost to follow-up.

At the time of enrolment most adult people in our sample (354 women and 36 men) were in the early stages of infection: 315/354 (88.9%) women and 25/36 (69.4%) partners were in stages WHO-1 or WHO-2, while only 39/354 (11%) women and 11/36 (30.5%) partners were in stage WHO-3 or in stage WHO-4. (table 3a and 3b).

Clinical Stage		Immunological severity level §		
		SEVERE (< 200 CD4/µl)	INTERMEDIATE (200-349 CD4/µl)	MODERATE (≥ 350 CD4/ µl)
Stage I	194 (54.8%)	30	55	107
Stage II	121 (34.2%)	44	35	41
Stage III	36 (10.2%)	22	9	4
Stage IV	3 (0.8%)	3	0	0
TOTAL	354	99	99	152

§ data not available for 4 patients

Table 3a. Clinical and immunological staging of HIV-infected pregnant women

Clinical stage		Immunological severity level ¥		
		SEVERE (< 200 CD4/µl)	INTERMEDIATE (200-349 CD4/µl)	MODERATE (≥ 350 CD4/µl)
Stage I	15 (41.7%)	2	6	6
Stage II	10 (27.8%)	5	2	3
Stage III	11 (30.6%)	7	2	1
Stage IV	0	0	0	0
TOTAL	36	14	10	10

¥ data not available for 2 patients

Table 3b. Clinical and immunological staging of HIV-infected partners

Altogether, the mean CD4+ value in the adult sample is 350.5 CD4+/µl (range 1 - 1769 CD4+/µl), higher in women (361.6 ± σ 253.7) than in men (281.3 ± σ 188), although this difference is not statistically significant (p=0.067).

As many as 113/384 (29.4%) patients (99 women and 14 partners) had a CD4+ cell count below 200 cells/ μ l at recruitment, immediately meeting the 2006 WHO guidelines eligibility criteria to start HAART. As a matter of fact, 95/113 patients started HAART within 6 months while 5/113 (all in clinical stage WHO-1) started HAART at a later time and 13/113 never started treatment because they were lost to follow-up or died soon after recruitment.

4. Discussion

Since the results of the HIVNET-012 (Guay et al, 1999) and other PMTCT clinical trials (Dabis et al., 1999; Shaffer et al., 1999) were made available, the adoption of single-dose NVP at delivery as preventive strategy to reduce mother to child HIV transmission rate has avoided many neonatal infections in Developing Countries, allowing at the same time to detect – and cure - a high number of HIV-infected women.

However, the early emergence of HIV nevirapine-resistant strains urged to identify alternative strategies (Johnson et al, 2005).

To face these limits, WHO guidelines for PMTCT were reviewed in order to avoid the risk of viral resistances (WHO, 2006). Moreover, WHO approved MTCT-plus strategy in 2003, suggesting the adoption of a program of comprehensive care for the HIV-positive woman and for all the members of her family.

These treatments include health care, social and psychological support, reproductive health and family planning services, education and nutritional support. With this initiative, the international community has recognized the centrality of the family's role and the great contribution that women offer to the fight against AIDS (Rabkin et al., 2003).

Our study assesses the effectiveness of the MCTC-plus routine implementation in real life condition in an urban area of a resource-limited Sub-Saharan African country (Burkina Faso) to detect HIV+ family members of HIV-infected pregnant women.

In 2002, the national PMTCT program started in Burkina Faso, in three different pilot sites, including St. Camille Medical Center. The number of PMTCT centers in Burkina Faso has progressively and rapidly expanded to 803 in 2008, with a complete coverage of all Health Districts in the Country (CNLS Data, 2009).

This decentralized approach is in line with the most recent recommendations for the progressive increase of antiretroviral coverage as close as possible to the patients' households (Ferradini et al., 2006).

MTCT-plus program activities are in fact considered as the most important tool to detect HIV-infected people as early as possible.

The effectiveness of MTCT-plus program depends, first of all, on the VCT acceptance rate, the real entry point into the program. Actually, wide variations in the VCT acceptance rate were recorded in different geographic environment especially because of different cultural and organizational factors (Perez et al., 2004; Pignatelli et al., 2006; Tonwe-Gold et al., 2009).

The high number of pregnancies (more than 3,000/year) and of the ante-natal visits did not allowed our staff to provide an individual counselling and obliged us to adopt the opt-in strategy. This may explain the low VCT acceptance rate observed in our centre (20.1%) compared to 80% acceptance rate recorded in other centres in Burkina Faso where the opt-out strategy is adopted (MSFL, 2006).

Nevertheless we did not observe any relevant loss in the follow-up, proving that women that accept opt-in VCT are highly motivated and willing to follow the program. In our experience the availability of antiretroviral drugs is not a relevant determinant for the acceptance of VCT. In fact, we did not observe any increase in the VCT acceptance rate linked to the increasing HAART availability over time. This observation suggests that cultural factors (partner's consensus, stigmatisation, illness perception, level of education) still play a very important role. An indirect confirmation comes from the higher educational level of our sample compared to that of the general female population attending the centre, 71% of which is illiterate (UNDP report 2009). Education is one of the most important factors facilitating VCT acceptance, together with obstetric history (Pignatelli et al., 2006; Perez et al., 2006).

The recorded HIV prevalence rate at St. Camille Medical Center is then significantly higher than in the general population of Ouagadougou (about 4%) and than the national statistics (1.8%): this suggests not only a predisposition of the women in our urban environment to undergo the test, but a further selection of the population for the PMTCT.

In fact, until the end of 2005, the SCMC in Ouagadougou was the only existing centre in Burkina Faso that implemented the MTCT-plus program. Pregnant seropositive women, followed by other centres, were often reported to SCMC just for the PMTCT before returning to their original center for follow-up.

The choice to implement the MTCT-plus program at the St Camille Medical Center compared to other centers, is due to the possibility to have access to many services that are not available in other centers, such as free formula milk, free laboratory follow up (test for children) and the possibility to have access to a Paediatrics unit and to the only neonatology unit existing in the Country. These facts also explain why many HIV-infected women (472/826; 57.1% of those women tested HIV-infected in our study) chose to deliver at the SCMC and to return for continuous follow-up at the original living area once the delivery has taken place.

The repeated offer to test the woman's family members in the period before and after childbirth and during the counselling meetings gave good results in our study as already reported. In particular, the involvement of the male partner in the VCT and the couple counselling was a very important element in order to increase the number of people taking part in the preventive programs (Katz et al., 2009).

On average, the immune status of the HIV-positive male partners was more compromised than the one of the pregnant females, suggesting the presence of an older infection. This fact, even if not statistically significant, matches with other report in the country (Salari et al., 2009). The number of HIV-negative male patients is not negligible (67/182, 36.5% of the tested partners). This is in line with data showing that in Burkina Faso about two thirds of HIV-infected couples are sero-discordant (de Walque, 2007). This shows the usefulness of the MTCT-plus protocol as a unique opportunity to promote preventive measure for negative partners.

The average number of living children is low (1.8/woman), especially if compared to the high fertility rate in Burkina Faso (6.2/woman) (CIA, 2009). This is probably due to the high foetal and infant mortality rate in mothers infected at St. Camille Medical Center (Pignatelli et al., 2006). In fact as many as 249 previously dead children were reported in our sample (249/896; 27.8%).

The lower fertility rate in HIV+ women, especially in the advanced stages of the illness, could be another possible reason (Le Coeur et al., 2005), and this reinforces the need to link HIV treatment and reproductive health services in the framework of the MTCT-plus initiative.

The screening of the children born from previous pregnancies was probably hampered by the fear of the parents to verify the status of the infection in their children for whom PMTCT protocols was not adopted and by the fear that elder children may reveal the secret in the community.

As expected, HIV infected pregnant women that entered the PMTCT program were almost all asymptomatic. However, CD4+ lymphocyte count is essential in order to identify those HIV-infected women that are eligible for the HAART. The mother to child HIV transmission rate (4.3%) is due to the failure of the nevirapine mono-prophylaxis and to the limited access to the HAART for those who needed it before 2006.

The relative older age of the women in our sample compared to the average of the age of the pregnant women at the SCMC is probably due to the fact that the older women are more free to autonomously accept the VCT proposal and can be more worried about the previous and “unexplainable” loss of a child (Pignatelli et al., 2006).

The decreasing trend recorded in the sero-prevalence rate among the younger pregnant women in Burkina Faso can be due to the campaigns focused on the education to health (UNAIDS/OMS/UNICEF/UE, 2006). This effort needs to be strengthened at every level.

The progressive increase of HAART availability in resource limited Countries underlines the role of MTCT-plus programs as a possible tool capable to identify motivated people in a sufficiently initial stage of the illness in order to benefit from the antiretroviral treatment.

In our study, the following socio-cultural factors have limited the effectiveness of the program: (i) refusal of the male partner to undergo the test (ii) refusal of the parents to test the children from previous pregnancies (iii) refusal of the pregnant woman to inform the partner about her serostatus. These reasons possibly find their explanation in the social stigma that HIV still cause in Western Africa.

5. Conclusion

The MTCT-plus approach might be an important tool to increase the early detection of HIV infected patients in the household of the infected pregnant women, allowing for beneficial early treatment. Furthermore detection of discordant couples offers possibilities to prevent infection. However, its effectiveness in the real-life condition of Western Africa is hampered by cultural factors that act at different levels (VCT uptake, notification to the partner, testing of previous children) and it requires new and innovative approaches in order to expand the adoption of HIV testing in Developing Countries.

The positive impact that HAART has on the lives of those affected may further increase acceptance of VCT and reduce stigma, thus allowing to save ever more people.

6. ESTHER-Brescia study group

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