

Monitoring the Effectiveness of Prevention of Mother-to-Child (MTCT) HIV Transmission in Trinidad a Small Middle Income Country, 2013-2016

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Abstract

Background: There is conclusive evidence of the efficacy of using antiretroviral therapy to reduce MTCT of HIV. In 2012, the World Health Organization announced a global plan to eliminate MTCT by 2015 that includes reducing HIV incidence among women and MTCT rates, and increasing uptake of maternal and infant ARVs for PMTCT. It is important therefore to measure what has been achieved to inform future strategies.

Objective: The purpose of this study is to conduct outcomes and effectiveness evaluations to better understand MTCT program impact among a subset of health facilities in Trinidad.

Design and Methods: A facility-based prospective observational study was conducted among pregnant women attending ANC clinics in 10 randomly selected health facilities in North Trinidad serving a population of 75 000. Data were collected from all women attending the antenatal clinics. Outcomes of interest included proportion actually tested, the proportion of newly identified HIV+ women, and HIV+ babies.

Results: A total of 7174 women were followed from 2013-2016. A total of 109 women were HIV + while pregnant. All of which were referred for specialist obstetric care. All gave birth to an HIV- baby, thus recording zero transmission rate. Both mother and baby were followed at the health facility after delivery for one year.

Conclusion: We provide evidence that currently available tools to significantly impact the HIV epidemic affecting children are effective.

Introduction

HIV transmission from mother to child (MTCT) can occur during gestation, during labor and delivery, or postpartum as a result of breast feeding [1]. New HIV infections among children have declined by 50% since 2010. Worldwide, 150 000 [110 000-190 000] children became newly infected with HIV in 2015, down from 290 000 [250 000-350 000] in 2010 [2]. A landmark 1994 multicenter trial conclusively demonstrated the efficacy of using antiretroviral therapy (ART) to reduce MTCT of HIV. The study reported a 67.5% relative reduction in MTCT with the use of zidovudine [3,4]. Programs involve a cascade of interventions, which begins with HIV counselling and testing of pregnant women at initiation of antenatal care (ANC), and provision of ARVs throughout pregnancy, peripartum, and in the postpartum period to prevent vertical HIV transmission [5]. Hence treatment is contingent upon the pregnant woman seeking antenatal care, being screened for HIV, and agreeing to medical intervention. Confidential HIV tests as well as free or affordable drugs aimed at preventing MTCT of HIV are accessible to an increasing number of pregnant women in developing countries, including Trinidad and Tobago (TTO) in which the current HIV prevalence is 1%. The price paid by HIV-infected newborns for their mothers' failure to undergo testing and treatment is very high; the average life expectancy of an HIV-infected new born who does not receive state-of-the-art medical care is approximately 2 years [6].

In 2012, the World Health Organization announced a global plan to eliminate MTCT by 2015 that includes reducing HIV incidence among women and MTCT rates, and increasing uptake of maternal and infant ARVs for PMTCT [7].

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The National HIV testing and counselling policy of the Ministry of Health (MoH) in Trinidad states, “voluntary counselling and HIV testing services shall be promoted and made available to pregnant mothers for the purpose of prevention of mother to child transmission (PMTCT) of HIV infection” [8]. In pursuit of this policy currently all pregnant women are offered the opportunity to be tested. If tested positive, confidentiality of the women’s HIV status during as well as after their pregnancy is maintained and specialist obstetric care at the time of ascertainment of HIV status to delivery is provided. In addition HIV+ve mothers and their babies are returned to the community where the mother and child are followed for one year. During this time in order to support a no breast feeding policy, the state provides all mothers with free formula milk for one year.

The purpose of this study is to conduct outcomes and effectiveness evaluations to better understand MTCT program impact among a subset of health facilities in Trinidad.

Methods

A facility-based prospective observational study was conducted among pregnant women attending ANC clinics in 10 randomly selected public health care facilities in North Trinidad serving a population of 75000. The study is aligned with the WHO recommendation to “review integrated data at facility, subnational and national levels” [9]. The study used quantitative data collected from the randomly selected 10 health facilities. All women regardless of age who sought ANC at the facilities were eligible for entry into the study. At entry if a participant was previously tested positive for HIV and pregnancy confirmed she was immediately referred for specialist obstetric care. All other mothers were tested according to the standard protocol for detection of antibody to HIV, which includes an enzyme immunoassay to test for antibody to HIV and confirmatory testing

with a more specific assay (Western blot) [10]. HIV tests were conducted on serum specimens collected by venipuncture at the first antenatal care clinic (ANC) attendance. HIV infection (as indicated by the presence of antibody to HIV) is defined as having a positive enzyme immunoassay test and a positive confirmatory supplemental test (Western blot). All newly identified HIV+ve mothers were also referred for specialist obstetric care. Clients were placed into three categories i.e. 1) HIV+ve, 2) HIV-ve and 3) status known prior to pregnancy. All HIV+ve mothers were followed for one calendar year after delivery. Data were analyzed and reported according to the STROBE recommendations [11]. Outcomes of interest included proportion actually tested, the proportion of newly identified HIV+ve women, and HIV+ve babies. Perinatal HIV was defined as HIV infection acquired by transmission from an HIV-positive mother to her child during gestation, labour and delivery, or after delivery as a result of breast feeding [12-15]. The HIV-positive mother does not automatically transfer the virus to her child [12]. In fact, newborns have only about a 25 percent chance of contracting HIV during gestation [12]. However the majority of babies who contract the virus perinatally do so during labour and delivery (70 to 75 percent) [12,14]. Hence HIV diagnosis of exposed infants was made by a positive virological test using Deoxyribonucleic Acid-Polymerase Chain Reaction (DNA-PCR) test at 6 weeks or as early as possible thereafter.

Results

A total of 7147 pregnant women attending ANC in a primary care setting were followed for the period January 2013 to June 2016, (Table 1). The majority of women (96%) were aged 20-40 years, while the majority (95%) of women testing positive for HIV were 20-30 years, there was only one woman aged 40 who tested positive. All women reported they were in a heterosexual relationship only. Hence the only method of transmission was

Year	PW	Tested Negative (n,%)	Status known	New cases	Total cases (n,%)	NT(n,%)
2016						
Jan-Mar	469	441(94)	7	1	8	20(4.3)
Apr-Jun	498	450 (90)	6	1	7	41(8.2)
Total	967	891(92)	13	2	15(1.6)	61(6.8)
2015						
Jan-Mar	540	473 (87.6)	6	0	6	61(11.3)
Apr-Jun	560	522 (93)	1	3	4	34(6.1)
Jul-Sept	491	435 (88.6)	8	1	9	47(9.6)
Oct-Dec	422	394 (93.4)	2	1	3	24(5.7)
Total	2013	1824 (90.6)	17	5	22(1.1)	166(8.2)
2014						
Jan-Mar	610	516(84.6)	9	2	11	83(13.6)
Apr-Jun	550	470(85.5)	5	4	9	71(12.9)
Jul-Sept	506	437(86.4)	5	4	9	60(11.9)
Oct-Dec	418	387(92.6)	2	4	6	25(6)
Total	2074	1810(87.3)	21	14	35(1.7)	239(11.5)
2013						
Jan-Mar	583	474(81.3)	10	3	13	96(16.5)
Apr-Jun	527	444(84.3)	5	3	8	75(14.2)
Jul-Sept	542	502(92.6)	5	2	7	33(6.1)
Oct-Dec	441	401(90.9)	6	3	9	31(7)
Total	2093	1821(87)	26	11	37(1.8)	235(11.2)

Table 1: The distribution of pregnant women (PW) attending ANCs in North Trinidad by, the number tested for HIV for the first time, previously tested for HIV and status known, total number of new cases identified and number not tested (NT) for 2016-2013.

heterosexual. Over the period studied of the 7174 attendees to the ANC's 83- 94% of women were actually tested for HIV. Of those who were tested 32 mothers were identified as HIV+ve for the first time. In addition 77 mothers were not tested because their status were identified as +ve in a previous pregnancy. Hence 109 pregnant women overall were identified as HIV+ve.

The proportion of mothers tested for HIV increased significantly ($p < 0.05$) from 81.3% in the period January-March 2013 to 94% in January-March of 2016. However there was no significant change ($p > 0.05$) in the proportion of HIV+ mothers, which varied from 1.8% in 2013 to 1.6% in 2016, although the number of newly identified HIV+ mothers declined. All HIV+ mothers received ART resulting in 109 (1.52%) babies born HIV negative and thus were prevented from acquiring HIV from their mothers. All HIV positive mothers were managed during the pregnancy at a tertiary center under the care of specialist obstetricians. Both mother and baby were referred back to the facility after delivery. At the facility not to breast feed the baby was reinforced and the state also provided free formula milk to support this strategy, for one year. During the period studied thus far there have been no dropouts or adverse consequences to formula feeding, and all infants remained HIV negative using DNA-PCR testing.

Discussion

An important finding of the study is the implementation of strategies for prevention of MTCT of HIV as promulgated by the WHO [16], actually prevented 1.5% of babies from acquiring HIV, as well as achieving zero transmission, among women attending 10 randomly selected primary care facilities in North Trinidad. The importance of this finding is, it provides empirical evidence that TTO is on the cusp of eliminating MTCT of HIV, and hence a generation of babies born HIV free. It also emphasizes that given the demographic, and socioeconomic characteristics of small island developing states combined with the contemporary burden of ill-health and relatively low health systems capacity the strategy of early identification of HIV during pregnancy through routine, antenatal HIV testing and provision of antiretroviral treatment can achieve results similar to those reported from resource-rich countries. For example, similar interventions have reduced the risk of HIV transmission by 1%-2% in the United Kingdom and Ireland [17]. Additionally, one key message that this study endorses is the model used i.e. linking HIV detection to advanced maternal and child health services thus creating strong links between primary care and tertiary care services with the goals of reducing cost, and the sharing and integration of data towards improving patient health outcomes.

Another interesting finding was twice as many women (77 vs. 32) were already aware of their HIV+ status at the start of their current pregnancy. In fact all 77 HIV+ mothers had a previous pregnancy while being HIV+, this finding raises several issues. PMTCT programs must now shift the emphasis beyond testing and ART initiation toward intensified efforts to retain mothers in lifelong HIV care and treatment. Several studies suggest that the rates of unintended pregnancy among HIV infected women may be higher than those in the general population. In a study in South Africa, 84% of pregnancies in HIV infected women were reported to be unplanned [18]. In Uganda, >90% of pregnancies were unintended among women enrolled in an antiretroviral treatment program [19]. A study in Côte d'Ivoire that involved 149 women

diagnosed with HIV infection during a previous pregnancy, found 37 repeat pregnancies, of which 51% were unintended [20]. Therefore these finding highlights the issue of meeting the special contraceptive needs of HIV infected women, together with the provision of couple counselling and testing. All of which have been shown to increase acceptance of HIV testing by pregnant women in studies from Burkina Faso, Cambodia, Kenya, Tanzania, and Uganda [21-25]. Also in family-focused programs with free access to antiretroviral therapy, such as the MTCT-Plus program in Côte d'Ivoire, only 53% of 568 women indicated that they had disclosed their HIV status to their male partner, with reasons for nondisclosure including fear of accusations of infidelity, abandonment, discrimination, and violence [26]. Further research surrounding the issue of disclosure and involvement of male partners is therefore needed.

The strategy not to breast feed used in this setting was successful. The success of this strategy may be attributed to monthly visits made to the facility by both mother and child. At these visits, not to breast feed was reinforced and the mother also received a supply of formula milk without cost. Thus emphasizing that the only method known to completely eliminate breast feeding associated HIV transmission is not to breastfeed. However this should only be implemented in settings in which infant replacement feeding is affordable and sustainable, clean water is widely available, hygiene and sanitation conditions are good, and death due to diarrhoea and other infectious diseases is relatively uncommon, all of which are satisfied in this setting.

One of the reasons for the success of PMTCT in TTO as reported in this study may also be due to the integration of antepartum and postpartum care systems and laboratory support both at the primary care and tertiary care levels. In TTO there is a two tier system of health care delivery, a private health care system based on a fee for service model and a public health care system financed totally by the MoH. On establishing HIV status the mother is immediately referred for specialist obstetric care at a tertiary center and on discharge both mother and baby return to the facility and are followed for one year. These services were delivered through the public health care system, which provides access to skilled professionals, treatment and follow-up to all clients without cost. Hence the ability to implement successful programs for PMTCT of HIV infection is less tied to financing the purchase of the drugs or choice of regimen than to the development and support of maternal and child health infrastructure required for implementation of such programs. Consequently structural factors in the health systems constitute the biggest challenges to implementing effective programs for PMTCT of HIV infection.

A major limitation of this study is all potential factors were not included and assessed which may affect generalization of the study. Notwithstanding the study provides evidence that PMTCT is effective.

In conclusion 2016 marked the 35th anniversary of the first published reports of HIV/AIDS, notwithstanding HIV/AIDS research must continue. In that context this paper provides evidence that currently available tools to significantly impact the HIV epidemic affecting children are effective. Further this study underscores the need for systematic evaluation of program effectiveness to measure the impact of programs for PMTCT of HIV infection and to determine best practices.

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