Journal of Infection (2014) 69, S56—S62

BIA
British Infection Association

www.elsevierhealth.com/journals/jinf

Mother to child transmission of HIV: What works and how much is enough?

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Accepted 18 July 2014
Available online 17 October 2014

KEYWORDS
HIV;
Mother;
Child;
Transmission;
Prevention;
Perinatal;
Pregnancy;
Anti-retroviral therapy

Summary In 2012, 3.3 million children were living with HIV (Human Immunodeficiency virus), of whom 260,000 were new infections. Prevention of mother to child transmission is vital in reducing HIV-related child mortality and morbidity. With intervention the risk of transmission can be as low as 1% and without it, as high as 45%. The WHO (World Health Organisation) recommends a programmatic approach to the prevention of perinatal HIV transmission and has withdrawn option A and introduced option B+. This recommends that all HIV positive pregnant and breastfeeding women receive lifelong triple ARV (antiretroviral) from the point of diagnosis. The infant would then receive 4—6 weeks of ART (antiretroviral therapy) (NVP, nevirapine or AZT, Zidovudine) regardless of the feeding method. Where resources are not limited an individualised approach can be adopted. Worldwide, health care needs to be accessible and HIV testing performed in pregnancy and followed up in a robust but socially sensitive way so that treatment can be initiated appropriately. In either setting the risk of transmission is never zero and countries need to decide for themselves what is the most practical and sustainable approach for their setting, so that the maximum impact on maternal and child mortality and morbidity can be achieved.

The global picture

It is estimated that 35.3 million people are living with HIV worldwide, with 25 million living in sub-saharan Africa.[1] 3.3 million children are living with HIV, of whom 260,000 were new infections in 2012.[1] In the 22 priority countries in the Global Plan, coverage of ART amongst pregnant women living with HIV reached 62% and approximately 230,000 children were newly infected with HIV in these countries in 2012.[1] Children living with HIV in low and middle income countries, eligible for ART are less likely than adults to receive it, with ART coverage being 34% for children and 64% for adults in 2012.[2] Prevention of mother to child transmission is key to reducing the HIV-related child mortality and morbidity (see Table 1).

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http://dx.doi.org/10.1016/j.jinf.2014.07.018
0163-4453/

Table 1 WHO recommendations for prevention of mother to child transmission 2012.

	Woman receives:		Infant receives:
	Treatment (for CD4 count $\leq$ 350 cells/mm^3)	Prophylaxis (for CD4 count $>$ 350 cells/mm^3)	
Option A[a]	Triple ARVs starting as soon as diagnosed, *continued for life*	*Antepartum:* AZT starting as early as 14 weeks gestation *Intrapartum:* at onset of labour, single-dose NVP and first dose of AZT/3TC *Postpartum:* daily AZT/3TC through 7 days postpartum	Daily NVP from birth until 1 week after cessation of all breastfeeding; or, if not breastfeeding or if mother is on treatment, through age 4—6 weeks
Option B[a]	*Same initial ARVs for both*[b]: Triple ARVs starting as soon as diagnosed, *continued for life*	Triple ARVs starting as early as 14 weeks gestation and *continued intrapartum and through childbirth if not breastfeeding or until 1 week after cessation of all breastfeeding*	Daily NVP or AZT from birth through age 4—6 weeks regardless of infant feeding method
Option B+	*Same for treatment and prophylaxis*[b]: Regardless of CD4 count, triple ARVs starting as soon as diagnosed,[c] *continued for life*		Daily NVP or AZT from birth through age 4—6 weeks regardless of infant feeding method

From UNICEF. Options B and B+: key considerations for countries to implement an equity-focussed approach. Eliminating new HIV infections among children and keeping mothers living with HIV alive and well; July 2012.[5]
Note: "Triple ARVs" refers to the use of one of the recommended 3-drug fully suppressive treatment options. For the drug abbreviations in the table: AZT (azidothymidine, zidovudine [ZDV]); NVP (nevirapine); 3TC (lamivudine).
[a] Recommended in WHO 2010 PMTCT guidelines; single dose NVP and AZT + 3TC intrapartum and postpartum tail can be omitted if the mother received more than 4 weeks of AZT during pregnancy; in this case continue maternal AZT twice daily during labour and stop at delivery.
[b] True only for EFV-based first-line ART; NVP-based ART not recommended for prophylaxis (CD4 >350).
[c] Formal recommendations for Option B+ have not been made, but presumably ART would start at diagnosis.

Without intervention the risk of MTCT (mother to child transmission) ranges from 20 to 45%.[3] In non-breastfeeding populations, with specific interventions the risk of MTCT can be as low as less than 1% and as low as 2—5% in breastfeeding populations.[4] Target 3 of the United Nations Programme on HIV/AIDS (UNAIDS) goals for 2015 is to eliminate new HIV infections amongst children by 90% and to substantially reduce AIDS related maternal deaths by 50%.[3,5] The millennium development goal 4 is to reduce the under 5 mortality by two thirds by 2015.[4] Goal 5 aims to reduce maternal mortality by three quarters and have universal access to reproductive health by 2015.[6] Millennium Goal 6 aims for the number of new HIV infections to have halved by 2015 and for there to be universal access to treatment by 2010.[4] In the context of the UNAIDS goals and the millennium development goals we are in a critical position to assess current progress and recommit to advance our success in tackling this issue both on national and international levels.

In 2011 the countries with the lowest estimated coverage of the most effective regimen were North Africa and the middle east (9%), west and central Africa (26%) and East, South and South east Asia (20%).[7] This compares with Europe and central Asia (95%) and sub-Saharan Africa (58%).[7] There has been a steady decline of 24% in MTCT in sub-Saharan Africa from 2009—2011.[7] There were modest declines in the Caribbean and Oceania, with North Africa and the Middle East yet to show any decline.[7] However different countries will have different priorities depending on the nature of their epidemic. For example, the Western Pacific, South East Asia and the Americas focus on the dual elimination of HIV and congenital syphilis, whereas Eastern Europe targets the IV drug users and their partners as a priority population for improving PMTCT (prevention of mother to child transmission).[4] In 2010 the Pan American Health Organisation and UNICEF (United Nation's International Children's Emergency Fund) developed strategies for the advancement of elimination of MTCT of HIV and congenital syphilis.[6] The aim was to reduce new paediatric cases of HIV to 0.3 per 1000 live births and to reduce congenital syphilis to 0.5 cases per 1000 live births by promoting the integration of HIV, sexual and reproductive health, paediatric, family and community health services.[6] It aims to ensure that women have access to rapid diagnostics for both HIV and syphilis and to treatments and monitoring. Studies in nine European countries found that HIV prevalence in women IVDU (intravenous drug users) was 50% higher than among male IVDU.[8] MTCT was also found to be 42% higher in this female group when compared to HIV positive mothers who were not drug users, in the Ukraine.[8] One step towards combating this problem is the integration of antenatal services with drug treatment services.[8]

So whilst data showing downwards trends is encouraging we need to ensure that all pregnant women living with HIV have safe and simple access to ART, with prime focus on those living in the hardest to reach settings. This refers to both the difficult to reach geographical and social