

BREAST-FEEDING AND HIV: AN UPDATE

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Breast-feeding is a route of transmission of HIV from an infected mother to her infant. However, breast-feeding is an important pillar of child survival and the ideal way of feeding an infant, as well as providing a unique biological and emotional basis for child development. This article highlights the dilemma created by the risks and benefits of breast-feeding and will discuss factors that increase the risk of HIV transmission during breast-feeding as well as strategies that could be employed to reduce these risks. Many questions remain unanswered.

The subject of breast-feeding and HIV has become a highly emotive debate because of the polarisation between those whose mandate is preventing the spread of HIV, and therefore stress the importance of replacing breast-feeding, and those whose mandate is child survival, and therefore promote breast-feeding as one of the pillars of child survival.

QUANTIFYING THE RISK OF HIV TRANSMISSION THROUGH BREAST-FEEDING

DURATION OF BREAST-FEEDING

Since the advent of polymerase chain reaction (PCR) testing it has been possible to determine the risk of HIV transmission via breast-feeding more accurately. To date there has only been one randomised controlled clinical trial (RCT) of breast-feeding versus formula; however, the study had a serious limitation in terms of lack of compliance with the assigned feeding mode. This Kenyan study found a risk of transmission of 16% by age 24 months.¹ It is unlikely that any groups in the future will attempt an RCT of feeding practices, as the Kenyan trial showed that it is very difficult to randomise a behaviour, like breast-feeding, that is so inherently part of a woman's motherhood. Furthermore, it is now generally agreed that it would be unethical to repeat such a trial. In order to determine the risk of breast-feeding transmission more accurately, the Breastfeeding and HIV International Transmission Study (BHITS) Group² therefore conducted an individual patient data meta-analysis of 4 085 predominantly breast-fed children who participated in nine RCTs testing the effect of nutrients or antiretroviral drugs to prevent mother-to-child transmission of HIV (PMTCT). By definition, any HIV infection detected by PCR after 4 weeks of age was attributed to breast-feeding transmission. The probability

of breast-feeding transmission of HIV was estimated to be 9.3% at 18 months, and the overall risk of breast-feeding transmission was estimated as 8.9 transmissions/100 child-years of breast-feeding, which is interpreted as a monthly risk of 0.74% per month of breast-feeding. The meta-analysis demonstrated that the risk of transmission was cumulative and roughly constant throughout the breast-feeding period. *A suggested figure to work with is therefore a 4% risk for every 6 months of breast-feeding.*

PATTERN OF BREAST-FEEDING

Most studies attempting to estimate the transmission of HIV attributable to breast-feeding have made no attempt to define the pattern of breast-feeding. Just as it is important to specify the duration of breast-feeding when assigning risk, so too is it important to specify the type of breast-feeding that is practised. In most studies insufficient information has been collected to enable infants to be classified as receiving exclusive breast-feeding (EBF) or breast-milk in addition to other liquids and/or solids in the first 6 months (mixed breast-fed). Many researchers have used arbitrary definitions of EBF and not the accepted World Health Organisation (WHO) definition, which defines EBF as breast-milk only, with no other solids or liquids. The only prospective study that used the correct definition of RBF was conducted in Durban.³ In this study³ HIV-infected women who chose to breast-feed were encouraged to practise EBF as a possible way of reducing risk of HIV infection. The study found that the cumulative probability of HIV infection was similar among never-breast-fed and EBF infants up to 6 months, i.e. 19.4% (95% CI: 13.6 - 26.0) and 19.4% (95% CI: 12.5 - 27.4), respectively, but it was higher in the mixed breast-fed group, i.e. 26.1% (95% CI 20.5 - 31.9). The results of this study suggest that the vertical transmission of HIV through

RISK FACTORS FOR BREAST-FEEDING TRANSMISSION OF HIV

Strong evidence

High plasma viral load
Advanced disease/low CD4 count
Breast pathology – mastitis, abscesses, cracked or bleeding nipples
Primary infection/new infection
Prolonged duration of breast-feeding – more than 6 months

Limited evidence

Non-exclusive breast-feeding in the first 6 months
High breast-milk viral load
Subclinical mastitis as evidenced by increased breast-milk sodium levels

Low maternal levels of vitamins B, C and E
Infant oral candidiasis

breast-milk is dependent on the pattern of breast-feeding and not simply on breast-feeding *per se*. A limitation of the study was measuring adherence to the reported feeding practice. Measuring adherence will always be difficult and future studies have been encouraged to incorporate frequent monitoring, in order to improve the validity of the maternal recall.

Several, large, well-designed, prospective cohort studies in South Africa, Zimbabwe, Cote d'Ivoire and Zambia are currently in progress to examine more closely the effect of EBF on the risk of breast-feeding transmission. Preliminary results of the Zimbabwean⁴ and Cote d'Ivoire⁵ studies presented at the International AIDS Conference in Bangkok, (July 2004) have confirmed the finding that *exclusive breast-feeding carries a much lower risk of HIV transmission than mixed breast-feeding*.

IMPACT OF BREAST-FEEDING ON THE HIV-INFECTED MOTHER

Considerable evidence suggests that breast-feeding may be associated with maternal health benefits.⁶ These include decreased postpartum bleeding and decreased menstrual blood loss during the months following labour; delayed resumption of ovulation with increased child-spacing; improved postpartum bone remineralisation and decreased postmenopausal hip fractures; and decreased rates of ovarian and breast cancer.

In contrast to these maternal health benefits, Nduati and colleagues reported that 24-month maternal mortality among breast-feeding HIV-seropositive mothers they followed up in Kenya was significantly increased relative to formula-feeding counterparts.⁷ The accompanying commentary by Newell⁸ pointed out that the data needed to be interpreted with caution because of limitations in the study. Furthermore, the results of this study were dissimilar to the results of the Durban study,⁹ which failed to show an increase in either mortality or morbidity in the breast-feeding group.

Following the reporting of these two studies, the WHO convened an expert meeting and concluded that there was insufficient evidence to suggest that breast-feeding by HIV-infected women increases their mortality risk.¹⁰

Subsequent to this WHO statement, a Tanzanian study,¹¹ a Zambian study,¹² and a meta-analysis involving nine large studies¹³ have shown clearly that *breast-feeding does not pose any mortality or other health risk to the HIV-infected mother*.

MORBIDITY AND MORTALITY RISKS OF NOT BREAST-FEEDING

As mentioned earlier, simply encouraging women not to breast-feed in order to prevent postnatal transmission of HIV is not straightforward, as not breast-feeding carries its own risks. The objective of any PMTCT strategy must be to optimise overall child survival, including that of children of HIV-uninfected women. Central to this decision is determining the risk of morbidity and death associated with both breast-feeding and not breast-feeding, and what impact the recommendation and/or provision of formula milk or other replacement feeds to HIV-infected women will have on the feeding practices of uninfected mothers.

Breast-milk fulfils the infant's total nutrient requirements for the first 6 months of life and remains a valuable source of nutrition up to 2 years and beyond. Breast-feeding is obviously the most economical and safe mode of infant feeding, is important in promoting the mother-infant relationship, and may enhance the child's intellectual development.⁶ The more well-known benefit of breast-feeding to the infant is reduction of the risk of infection, especially infections resulting in diarrhoea and pneumonia, and this has been reinforced by a recent meta-analysis.¹⁴ In this meta-analysis, which included studies from Brazil, Pakistan and the Philippines, breast-feeding was shown to protect against child mortality especially in the early months (odds ratios were 5.8, 4.1 and 2.8 for infants 0 - 2, 3 - 4 and 5 - 6 months of age respectively). The odds ratios for protection against death from diarrhoea and acute respiratory infections in the first 6 months of life were 6.1 and 1.9, respectively. The authors concluded that 'it will be difficult, if not impossible, to provide safe breastmilk substitutes to children from underprivileged populations'.

The benefits of breast-feeding in terms of reduction of mortality from infections are unlikely to be as important in well-resourced developed communities where the risks of artificial feeding can be minimised. However, even in

developed countries breast-feeding may protect against bacterial and viral infections and later onset of health problems such as diabetes, cardiovascular disease and cancer.

MAKING INFORMED CHOICES ON INFANT FEEDING

Because of the paucity of well-designed prospective trials evaluating the long-term relative risks associated with breast-feeding and formula-feeding in settings of high HIV prevalence, several groups have designed mathematical models to assess the net mortality. In a recent modelling exercise Kuhn *et al.*¹⁵ estimate that when infant mortality rates are greater than about 40/1 000 live births, providing formula milk to HIV-infected women would result in the excess number of deaths arising from formula use being approximately the same or greater than the number of HIV infections that might be prevented.

Counselling and empowering women to make an informed choice on infant feeding is not simply a matter of informing or educating them about the theoretical risks and different feeding options. Health workers need to assess the individual mother's circumstances to ascertain what is most feasible and safe for her. Time is required to explain the factors that increase breast-feeding transmission or morbidity from replacement feeds and suggestions to reduce these risks. In addition to a deep understanding of the social issues and the household situation, counsellors need to have the ability to translate complex scientific concepts on risk in a way that can be understood by women who do not grasp these dilemmas. They need to express compassion and have the ability to emotionally support women in a decision that affects themselves, their children, and the rest of their family.¹⁶ Experience has shown that quality of counselling needs to be prioritised in all programmes if women are to be assisted to make informed choices.¹⁷

Now that there is growing evidence that mixed breast-feeding carries considerable risk for HIV transmission, those implementing PMTCT programmes should be cautious about the distribution of free formula milk, as this practice seems to encourage mixed breast-feeding.^{17,18} If programmes are intent on providing free formula, a more equitable and safer approach would be to provide a choice of either formula milk for the infant or an equivalent value of food vouchers for the mother.

For those mothers who choose exclusive breast-feeding, a second choice will need to be made at about 6 months of age. The guidance that should be given at this stage is that if the child is infected or suspected to be infected, the child should continue being breast-fed. If the child is uninfected, and provided that the child will have access to adequate

complementary food, the mother should be encouraged to stop breast-feeding in a short period of about 1 - 2 weeks. Mothers should be provided with specific guidance and support when they cease breast-feeding to avoid harmful nutritional and psychological consequences to the infant and to maintain their breast health. If the infant will not have access to adequate complementary food, the best option is probably for the mother to express and heat-treat her breast-milk,¹⁹ and rather spend the money that would have been spent on formula milk on complementary food.

STRATEGIES TO REDUCE BREAST-FEEDING TRANSMISSION AND IMPROVE CHILD SURVIVAL

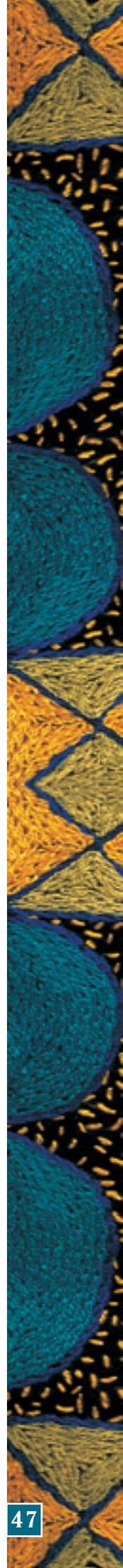
Until more data are available to inform these issues, what can be done to minimise breast-feeding transmission and optimise child survival? Counselling skills and opportunities should be improved so that health workers are more able to assist women to make informed choices that they are committed to follow. For women who choose or need to breast-feed, experienced support should be available to ensure good exclusive breast-feeding practices so as to minimise breast pathology, HIV viral load and disruptions to the gut environment, and therefore to reduce risk of HIV transmission. Breast-feeding should be discouraged for those women who have progressed to AIDS and have very low CD4 counts.

Strategies that should be employed to minimise risk of transmission include the following:

- Exclusive breast-feeding during the first 6 months.
- A shorter duration of breast-feeding – about 6 months.
- Good lactation management must be provided, so that breast-feeding problems such as cracked nipples, engorgement and mastitis are prevented.
- If the mother does develop mastitis or abscesses, she must express milk from the affected side frequently and discard it, and continue feeding from the unaffected side.
- Condoms must be used throughout the lactation period.
- If the infant has oral thrush it must be treated promptly.

Pasteurisation of expressed breast-milk, using a method that is practical and feasible even at home, can be used to effectively kill all cell-free HIV.¹⁹ This strategy is likely to be difficult to implement from birth but may be more relevant after 6 months or as a temporary measure to sustain exclusive breast-feeding where the mother is unwell or away from her child.

For those mothers who choose replacement feeding, support should be available to demonstrate preparation and safe storage of commercial infant formula to minimise the risks of diarrhoeal morbidity and malnutrition.



Communities need to be engaged to be supportive of mothers with HIV infection and accept the varied approaches to infant feeding that may occur.

USE OF ANTIRETROVIRALS TO PROVIDE INFANT PROPHYLAXIS DURING BREAST-FEEDING

Recent animal trials and clinical trials suggest that antiretrovirals given to the infant during the first few weeks after delivery may protect the infant from HIV transmission during the breast-feeding period. In order to provide more conclusive evidence on the efficacy of antiretrovirals given to the infant, several studies are currently underway testing the use of single or dual antiretroviral drug regimens given for periods from 1 week to 6 months.²⁰

BREAST-FEEDING IN THE HIGHLY ACTIVE ANTIRETROVIRAL THERAPY (HAART) SETTING

As already mentioned, maternal HIV viral load has consistently been shown to be an important risk factor for breast-feeding transmission. It therefore seems very likely that giving HAART to the mother during the lactation period could reduce transmission. For women in the developing world, providing HAART during the pregnancy and lactation period is emerging as a cost-effective option that is currently under investigation in several trials.²⁰ It is likely that in the near future many women may already be on HAART, and the question that is often posed is: 'Can a woman on HAART safely breast-feed?' Unfortunately we do not yet have enough information to answer this question definitively, and can only suggest that given that the viral load in women on HAART will be very low (at undetectable levels), there should be no or minimal risk of breast-feeding transmission. Other considerations to bear in mind in this decision would be safety issues. We know that most antiretrovirals will be excreted into the breast-milk and the infant will be exposed to small quantities. For those drugs that have been widely used in infants, such as nevirapine (NVP), zidovudine (ZDV) and lamivudine (3TC), there are unlikely to be safety concerns. The most obvious concern will be the fact that infants will be exposed to subtherapeutic levels of antiretrovirals through the breast-milk, and if some infants escape protection and become

HIV-infected, they may have developed resistance to the drugs used that will impact on their future HIV treatment. Several trials are currently investigating these issues.²⁰

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