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HIV AND INFANT FEEDING

Abstract

Mother-to-child transmission of HIV can take place in utero, intrapartum and postnatally through breastfeeding. The success and availability of antiretroviral drug interventions that reduce in utero and intrapartum transmission of HIV have shifted the focus to identifying interventions that will reduce postnatal transmission of HIV through breast milk. This chapter reviews the main infant feeding options for HIV-positive women which include replacement feeding or exclusive breastfeeding with early weaning. It looks at the challenge in finding ways to make feeding safer for infants of HIV-positive women, and finding effective strategies for supporting women in their infant feeding choices. Lastly, it reiterates the need for community level interventions that can increase the acceptability of feeding practices that are different from existing norms.

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Introduction

Transmission of HIV from mother-to-child after birth has become one of the greatest challenges in HIV prevention. The transmission of HIV through breast milk has created a dilemma; for each HIV-positive woman the benefits of breastfeeding, and the risks of not breastfeeding, have to be weighed against the risk of HIV transmission through breastfeeding. Whilst intrauterine and intrapartum transmission can be substantially reduced through improved drug regimens, modifying infant feeding practices in order to reduce postnatal transmission is complex and proving difficult to achieve. Mother-to-child transmission (MTCT) of HIV rates of less than 2% are now reported from countries where antiretroviral prophylaxis, elective Caesarean section and refraining from breastfeeding can be applied,[1] whilst in settings where refraining from breastfeeding is not feasible or safe, programmes for prevention of MTCT need to focus not only on preventing HIV transmission but also on improving child survival. This chapter will summarise the benefits and risks of different infant feeding options for HIV-positive mothers. It will also briefly describe some of the recent scientific data and programmatic experiences and discuss the policy options available.

Overview of the Scientific Evidence

Benefits of Breastfeeding and Risk of Transmission

The single most effective way of saving the lives of millions of young children in developing countries would be the promotion of exclusive breastfeeding (EBF). Over a period of 10 years it could save the lives of an estimated 15 million children.[2] Breastfeeding makes a major contribution to child health by protecting infants from morbidity and mortality associated with common infectious diseases. Breastfeeding is also said to provide a number of social, psychological, family spacing and economic benefits to both mother and baby.[3,4]

> *"Infants aged 0-5 months who are not breastfed have seven-fold and five-fold increased risks of death from diarrhoea and pneumonia respectively, compared with infants who are exclusively breastfed. At the same age, non-exclusive rather than exclusive breastfeeding results in more than two-fold increased risks of dying from diarrhoea and pneumonia."*[5]

This assertion, and related comments and findings are set out by the Bellagio Child Survival Group in a recent article series in the Lancet[2,5] summarising findings from international research of how best to reduce infant mortality in developing countries.

The finding that HIV is present in breast milk has led to a re-assessment of the benefits of breastfeeding. Breast milk can transmit HIV at any time during lactation; therefore the rate of HIV infection in breastfed infants is cumulative and increases with duration of breastfeeding. An individual patient meta-analysis[6] estimated that the cumulative probability of late postnatal transmission between 4 weeks and 18 months of age was 9.3% or 9 infections per 100 child years of breastfeeding and that the risk of transmission was constant throughout breastfeeding. In this meta-analysis, approximately 42% of all HIV infections were attributable to breastfeeding.

Several factors are known to increase the risk of HIV transmission through breast milk. The maternal factors for which there is strong scientific evidence include advanced HIV disease / low CD4 count, high viral load and breast pathology (mastitis and abscesses). In particular, recent HIV infection is an important risk factor for HIV transmission through breast milk as it doubles the risk compared to a woman with earlier established infection due to the high viral load associated with recent infection.[7]

Infant factors known to increase the risk of transmission through breastfeeding include damage to the mucous membranes (e.g. by oral thrush), damage to the intestinal mucosa by cow's milk or allergic reactions to complementary foods and mixed feeding which may affect intestinal permeability.[8] Exclusively breastfed infants may have a less permeable and therefore healthier gut lining than those not breastfed.

Elimination of the risk of postnatal transmission through breast milk is possible through complete avoidance of breastfeeding. Where avoidance of breastfeeding is not possible, alternative strategies are needed to make breastfeeding safer for infants

of HIV-positive women. Given that high viral load and advanced maternal HIV disease are the most important risk factors for HIV transmission through breast milk, studies are underway to explore the impact of antiretroviral therapy (ART) given to the mother who is breastfeeding or to the infant for the period of breastfeeding or to both. The aim is to prevent HIV transmission to infants during the period of breastfeeding, by reducing breast milk viral load, or providing antiretroviral (ARV) prophylaxis to infants to reduce sero-conversion.[9]

Results from trials providing prolonged prophylaxis to infants of HIV-positive mothers have shown promising results. The MITRA study in Tanzania[10] is a non-randomised study where mothers were given combivir (ZDV / 3TC) from week 36 of pregnancy to 1 week after delivery and infants were given combivir for 1 week, and daily 3TC (4 mg/kg) throughout the breastfeeding period. Mothers were counselled to stop breastfeeding by 6 months. At 6 months, 4.9% of infants were HIV-positive, compared to 11.9% in the historical control group (p=0.003).

Trials are also underway to treat mothers with antiretroviral therapy during the breastfeeding period to lower their viral loads. The MASHI[a] study in Botswana[11] compared breast milk HIV Ribonucleic acid (RNA) and Deoxyribonucleic acid (DNA) in women receiving or not receiving Highly Active Antiretroviral Therapy (HAART). Results showed that women who were receiving HAART had significant reductions in breast milk cell-free HIV RNA compared to women not receiving HAART.

A multi-country study supported by World Health Organization (WHO), known as the Kesho Bora[b] study, is underway in four countries. The aim of the study is to assess the impact of maternal HAART on mother-to-child transmission and maternal health. Women with CD4+ counts <200/mm^3 or clinical HIV-related diseases will all be offered life-long HAART. Women with CD4+ counts >500/mm^3 who are at low risk of HIV transmission to infant and high risk of HAART toxicity and development of resistance will be offered short-course MTCT prophylaxis. Women with CD4+ counts 200-500/mm^3 where there is a risk-benefit balance between risks of HAART, reducing MTCT and the health benefits for mothers are not known, will be randomised to receive either short-course MTCT prophylaxis or triple-ARV MTCT prophylaxis during late pregnancy and breastfeeding. This study has just recently been started, so results are unlikely to be available for several years.

Given that maternal viral load is one of the most important factors in increasing the risk of HIV transmission through breast milk, it is essential that women diagnosed with HIV during pregnancy are referred for assessment for eligibility for ARVs.

Mode of Feeding and HIV Transmission

Approaches to reducing or preventing the risk of postnatal transmission through breastfeeding include the avoidance of all breastfeeding through the use of exclusive replacement feeds or exclusive breastfeeding for a limited duration with early and rapid cessation of breastfeeding around 4-6 months of age.

In order to guide health workers in assisting women to make appropriate infant feeding options WHO and United Nations Children's Fund (UNICEF) developed the Global Strategy for Infant and Young Child Feeding.[12] The recommendation for women known to be HIV-positive is avoidance of all breastfeeding if replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS). Otherwise, exclusive breastfeeding for the first months of life is recommended followed by early breastfeeding cessation as soon as feasible, when conditions for safe replacement feeding can be met.

The most commonly recommended infant feeding options for HIV-positive women in South Africa (SA) are replacement feeding with commercial infant formula provided free through public health services or exclusive breastfeeding with early cessation. Home modified animal milks, heat treatment of breast milk and breast milk banks are rarely practised.

a Mashi means milk in Setswana.

b Kesho Bora means a better tomorrow in Kiswahili.

Exclusive Breastfeeding with Early Cessation

Exclusive breastfeeding means nourishing an infant on breast milk alone with no other liquids or solid foods except for prescription medicines and vitamin-mineral supplements. Exclusive breastfeeding has been found to result in a lower rate of postnatal HIV transmission compared to mixed breastfeeding. A study in SA[13] found that infants who received both breast milk and other feeds were significantly more likely to be infected by 15 months of age (36%) than those who had been exclusively breastfed for the first three months (25%) or formula fed (19%). A similar finding was reported from the ZVITAMBO trial in Zimbabwe in 2005.[14] In this study amongst 2 060 HIV-positive mothers with infants who were HIV-Polymerase Chain Reaction (PCR) negative at 6 weeks, the rates of postnatal HIV transmission were 5.1, 6.7, and 10.5, per 100 child years of exclusive, predominant, and mixed breastfeeding respectively. Further studies are underway to confirm these findings.

Early cessation of breastfeeding is recommended for HIV-positive women as soon as replacement feeding is AFASS as a strategy to reduce the risk of HIV transmission by limiting the infant's exposure to HIV infection through breast milk. Early cessation means completely stopping all breastfeeding before age 2 years. There are limited data on the feasibility and impact of early breastfeeding cessation on infant HIV free survival and studies are currently underway to examine this issue in SA and Zambia.

Exclusive Replacement Feeding

Exclusive replacement feeding with no breast milk given eliminates the risk of postnatal HIV transmission. It is therefore the infant feeding method that is chosen by HIV-positive mothers in developed country contexts. However, in low and middle income countries, replacement feeding is not considered to be the automatic choice for HIV-positive women due to socio-economic environments that do not support safe replacement feeding. There are limited local data on the risks of replacement feeding in context of PMTCT of HIV but it is understood that these risks vary depending on individual and environmental circumstances.

In the general population the risks of formula feeding are well described. A pooled-meta analysis conducted by WHO[3] of studies in developing countries in populations of unknown HIV status, found that infants who are not breastfed and receive formula milk or other replacement feeding have a 6-fold increased risk of dying in the first 2 months of life, a 4-fold increase between 2-3 months, and a 2.5 fold increase between 4-5 months compared with those who are breastfed.

A randomised controlled trial conducted in a PMTCT setting in Kenya, that assigned women to formula feeding or breastfeeding, found that infants in the formula feeding group, whose mothers had access to clean water, free formula and frequent support by health workers, had a 40% lower risk of HIV transmission but their 24 month mortality was similar to that in the breastfed group.[15] During the first three months, infants in the formula fed group had an increased risk of diarrhoea,[c] dehydration[d] and upper respiratory infections.[e] However, infants in the formula feeding arm had a higher overall 2 year HIV-free survival of 70% compared to 58% in the breastfeeding arm.[16]

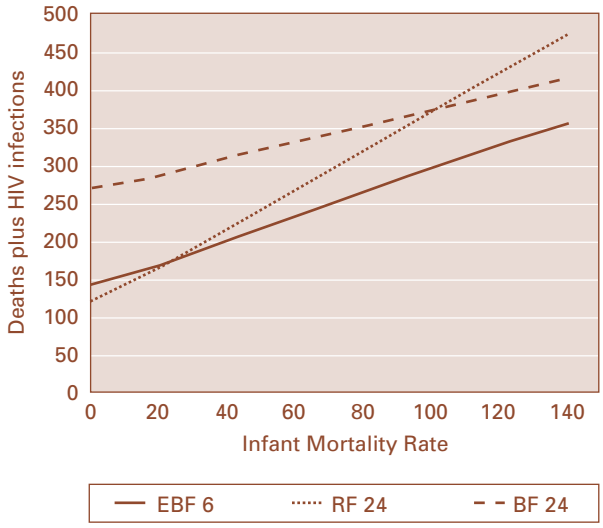
A more recent study from Kenya[17] followed infants in a perinatal cohort who were identified to be HIV infected in order to determine predictors of mortality during the first two years of life. One of the predictors of infant mortality in addition to biological factors was formula feeding (Hazard Ratio 4.0, p =0.01). All deaths amongst the non-breastfed infants occurred during the first six months of life and these infants were more likely to be of low weight for age at age one month, compared to breastfed infants.

Modelling the Risks of Different Infant Feeding Options

Prevention of HIV transmission associated with breastfeeding needs to be considered in a broad context that takes into account the need to promote breastfeeding of infants and young children in the general population. Several researchers have attempted to use mathematical models to guide policy makers in weighing the relative risks and benefits of breastfeeding and other infant feeding options. These models are limited by the scarcity of data on the risks associated

c Relative Risk of 2.7 at 95% and Confidence Interval of 1.6-4.6.
d Relative Risk of 11.9 at 95% and Confidence Interval of 1.6-91.9.
e Relative Risk of 1.3 at 95% and Confidence Interval of 1.1-1.7.

FIGURE 1:
HIV infections plus deaths at 24 months by infant mortality rate, according to postnatal PMTCT intervention scenario: usual BF (BF24), no BF (RF24), and EBF to 6 months (EBF6)



Source: Piwoz et al., 2005.[18]

with various methods of infant feeding, particularly in the first weeks of life, the risks associated with not breastfeeding in populations where HIV is prevalent and by the inability of models to take into account all the factors that influence individual decisions about infant feeding.

However, the modelling that has been done with the data available, provide some guidance to policy makers of the risks of different feeding options in different contexts. A recent model[18] suggests that in settings where the infant mortality rate (IMR) is <25/1 000 live births, replacement feeding results in the greatest HIV free survival, exclusive breastfeeding produces the best outcome where IMR is >25/1 000 live births, and replacement feeding results in a lower HIV free survival than no intervention where IMR is >101/1 000 (Figure 1).

Adapting this model to SA[19] suggests that in seven of the nine provinces, safer breastfeeding results in the greatest HIV free survival at 12 months. In the Western Cape and Gauteng, where IMR are low, no breastfeeding produced a similar outcome to safer breastfeeding.[f] However, in poorer settings like the Oliver Tambo district in the Eastern Cape, where IMR is above 80/1 000 live births, universal adoption of replacement feeding would lead to a lower HIV free survival than no intervention. For SA as a whole it was estimated that in comparison with the present situation, about 14 250 postnatal HIV infections/deaths could be avoided per year if optimal feeding options are adopted by all HIV-positive mothers.

f Defined as exclusive breastfeeding followed by rapid cessation.

BOX 1:
Summary of key points from the literature

- In the absence of HIV, breastfeeding is advantageous for a child's health.
- Antiretroviral prophylaxis can substantially reduce the risk of HIV transmission during pregnancy, labour and delivery.
- Postnatal transmission of HIV can be eliminated by the complete avoidance of breast milk and its substitution by replacement milks.
- HIV can be transmitted through breast milk at any time during lactation.
- Where breastfeeding is prolonged, transmission through breast milk may account for up to half of the HIV infections in infants and young children.
- Risk of transmission through breast milk is substantially increased by poor maternal health (high viral load and low CD4 count), recent infection and poor breast health (clinical and sub clinical mastitis).
- Exclusive breastfeeding has been found to result in a lower risk of postnatal transmission than mixed feeding.
- There are substantial risks to infants from not being breastfed in poor socio-economic contexts.
- Where IMRs are low (<25), replacement feeding results in the best outcomes for infants of HIV-positive women. Where IMRs are high (>25), exclusive breastfeeding is the safest method of feeding for HIV-positive women.

A major limitation of these models and their practical application is that there is an assumption that all infants in a particular province, or attending a particular clinic have a similar mortality risk. In reality, in SA, vastly different socio-economic groups (extremely poor and working class) live in close proximity to each other and may use the same health facilities. A provincial policy on infant feeding options would not take such diversities into account and further emphasises the need for infant feeding counselling to take into consideration individual home circumstances.

What is Required to Increase Optimal Infant Feeding Practices in South Africa?

Improving infant feeding practices in the general population

The challenge of improving infant feeding practices in SA should not be underestimated. WHO / UNICEF recommendations for women of unknown HIV status are six months of exclusive breastfeeding with continued breastfeeding and complementary feeding until age 2 years.[20]

Although most infants in SA are breastfed, only 7% of infants below six months are exclusively breastfed and 70% of infants receive supplementary food while breastfeeding.[21] A baseline survey of infant feeding practices in PMTCT and non-PMTCT clinics in SA[22] found even lower rates of exclusive breastfeeding of 4.7% in infants under 10 weeks dropping to 1.2% for children aged more than 10 weeks. Mixed breastfeeding was the most common practice with a rate of 75.2% amongst infants less than 10 weeks of age and 87.4% amongst infants more than 10 weeks of age. The survey also found a high rate of formula usage with 64.8% of the urban infants aged less than ten weeks receiving formula milk, either exclusively or simultaneously with breast milk.

It is against this background that infant feeding recommendations for women with HIV are being implemented. If women with HIV are to succeed in practising exclusive infant feeding then improvements in infant feeding practices in the general population are necessary to ensure that exclusive breastfeeding is a norm rather than an exception and that women opting for formula feeding are not stigmatised.

Good Quality Infant Feeding Counselling and Support

Reducing MTCT through improved infant feeding will require, at the very least, good quality counselling in all health facilities ideally backed up by similar actions and messages in the community. In South Africa significant investment has gone into training health workers at PMTCT sites on infant feeding using the WHO / UNICEF HIV and Infant Feeding training course. This was initially supported by UNICEF and the Centres for Disease Control and Prevention, South Africa and resulted in the training of close to 4 000 health workers between 2002 and 2003.[23]

The South African PMTCT policy expects health workers to counsel HIV-positive mothers and to recommend total avoidance of breastfeeding when replacement feeding is AFASS. HIV-positive mothers choosing not to breastfeed are provided with free formula feed for six months. Otherwise exclusive breastfeeding, followed by early breastfeeding cessation as soon as replacement feeding is AFASS is recommended.

However, there are shortcomings in the implementation of this policy. Even after training, health workers consistently over-estimate the risk of HIV transmission through breastfeeding. For example, an evaluation of the WHO / UNICEF infant feeding training found low levels of knowledge amongst both participants and trainers. Most participants (88%) over-estimated the risks of breastfeeding for HIV-positive women and very few (10%) knew of the health risks of formula feeding.[24] Participants' confidence in counselling following training was also disappointing with 44% being uncomfortable counselling women experiencing breastfeeding difficulties.

A similar cross-sectional assessment of health worker knowledge was undertaken in a rural area of KwaZulu-Natal. This study found that 71% of doctors would recommend water and 50% solids to breastfed infants under 6 months of age. The most common response by all health workers to problems of infants being thirsty or unsatisfied was to supplement with other fluids or feeds.

It is not surprising that health workers are generally unsure of how to guide the mother in making her feeding choice.[25] Providing full information to achieve empowered decision making in this context requires skilled counselling and additional time, which is often not available in busy health facilities. As a result, the quality of infant feeding counselling is poor. For example, one observational study[26] across three facilities in SA found that only 9% of women were asked about access to clean water, fuel and a fridge before deciding upon a feeding option. For women who opted to formula feed, there was no discussion about how the mother would explain the lack of breastfeeding to others. For women who chose to breastfeed, only 17% were asked if they understood the practice of exclusive breastfeeding and no one was asked if they thought it was feasible.

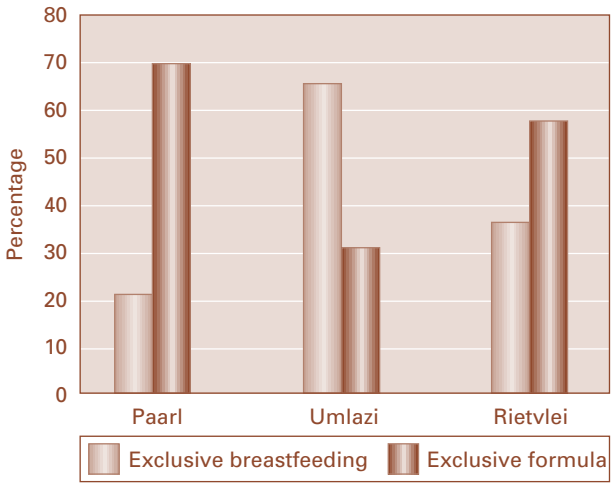
Subsequently many HIV-positive mothers are making inappropriate choices, such as choosing to avoid breastfeeding when the safety of replacement feeding cannot be assured and choosing to breastfeed when conditions for safe formula feeding are present. It is also clear that health workers are having a significant influence on mothers' feeding decisions and that individual circumstances are not being taken into account during counselling. For example, despite cultural and socio-economic similarities, the uptake of formula feeding was 65% in a relatively rural site near Pietermaritzburg compared with 40% a hundred kilometres away in an urban Durban site.[27]

Qualitative research with HIV-positive mothers confirms that confusion and uncertainty regarding the competing risks of HIV transmission through breastfeeding and mortality caused by not breastfeeding increases their reliance on the advice provided by the health worker.[28]

Improving Infant Feeding Choices and Practices Amongst HIV-positive Women

Due to the poor follow up of HIV-positive women through the routine public health services, very little is known about the actual infant feeding practices of this group. In order to describe these practices the national Department of Health (DoH) commissioned a group of research institutions to conduct a prospective cohort study known as the 'Good Start' study in three PMTCT sites; Paarl (rural / peri-urban Western Cape), Umlazi (peri-urban KwaZulu-Natal) and Rietvlei (rural Eastern Cape) in South Africa.[29] This study recruited 665 HIV-positive women and followed them until their infants were 36 weeks of age through regular home-based interviews and assessments of infant feeding practices and HIV transmission. The infant feeding intentions of women enrolled in the study differed greatly between the sites (Figure 2) and did not reflect what would be expected for the socio-economic or geographic region i.e. more women in the rural Rietvlei site chose to formula feed.

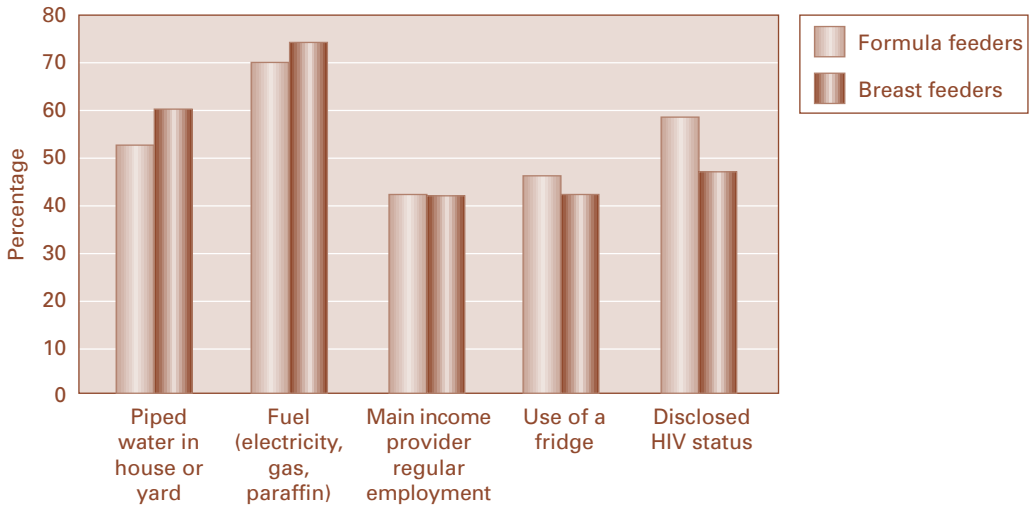
Figure 2:
Infant feeding intentions of HIV-positive women



Source: HST, 2005.[41]

The home circumstances of women choosing to breastfeed and women choosing to formula feed were similar in terms access to piped water, a sustainable source of cooking fuel, household income and use of a fridge. There were, however, higher rates of disclosure amongst women who chose to formula feed (Figure 3). This clearly indicates that the WHO / UNICEF guidelines are not being utilised in counselling, resulting in poor infant feeding decisions being made on both sides i.e. inappropriate choices to breastfeed and to formula feed. A similar situation was found in a study undertaken in a rural area of KwaZulu-Natal[30] where access to clean water and fuel was not associated with either feeding intention.

FIGURE 3:
Infant feeding choice according to key conditions

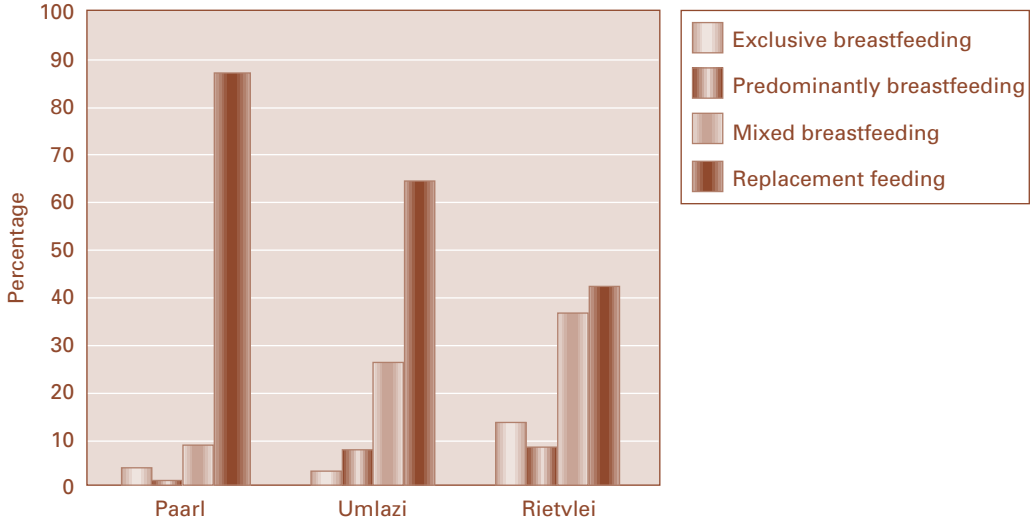


Source: HST, 2005.[41]

Infant feeding practices of mothers in the Good Start study at 12 weeks are shown in Figure 4. In Paarl, the majority of women were formula feeding with less than 10% mixed feeding. In Rietvlei, two thirds of women were formula feeding and just over a quarter were mixed feeding. In Umlazi, many more women were formula feeding than originally intended with just over 40% practising this option and over a third of women in this site were mixed feeding.

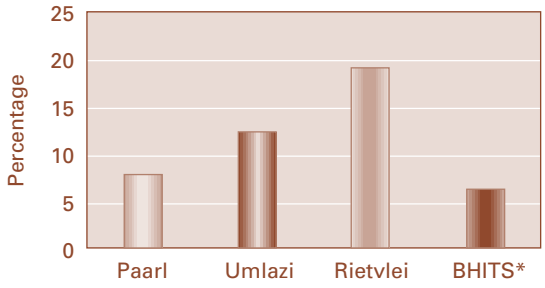
These infant feeding practices lead to different rates of late HIV transmission across the three sites (Figure 5). Only the Paarl rate was similar to the meta-analysis.[6] In Umlazi the late transmission accounted for almost half of the overall transmission and in Rietvlei it accounted for over half of total transmission and almost triple the rate at 36 weeks found in the meta-analysis.

FIGURE 4:
Infant feeding practices at 12 weeks



Source: HST, 2005.[41]

FIGURE 5:
Late postnatal HIV transmission (3-36 weeks)



Source: HST, 2005.[41]
* The Breastfeeding and HIV International Transmission Sudy Group

Key Challenges and Recommendations

Infant Feeding Policy Environment

The South African DoH Protocol for the PMTCT pilot sites,[31] has specific recommendations relating to HIV and infant feeding which suggests that: "where safe and adequate formula feeding is possible, and where ongoing support for mother and monitoring of an infant is available, formula feeding is the principal recommended method of feeding. The risks of feeding the infant with breast milk substitutes (mainly formula) must be balanced against the risks of HIV transmission through breastfeeding." It further suggests that HIV-infected women who choose to breastfeed be counselled and supported to exclusively breastfeed. The protocol also recommends pre and post natal counselling on infant feeding. The South African PMTCT protocol also makes provision for 6 months of free commercial formula milk for women choosing not to breastfeed.

In terms of broader infant feeding policies there has been little progress in finalising some important policies. SA currently has a draft "Infant and Young Child Feeding Policy" which has been in draft form for several years and has received comments and inputs from key stakeholders.

A second key infant feeding document is the Baby Friendly Hospital Initiative (BFHI) which is a WHO/ UNICEF approach to support appropriate infant feeding practices in hospitals. At the end of 2005 there were 178 (37%) hospitals in the country that had BFHI accreditation.[32] There is a modified draft BFHI policy that takes into account the needs of HIV-positive women in terms of supporting formula use in hospitals.

The third policy that requires urgent legalisation is the WHO / UNICEF Code of Marketing of Breast milk substitutes.[33] This code applies to the marketing of breast milk substitutes, including infant formula, when marketed or otherwise represented to be suitable for use as a partial or total replacement of breast milk. The Code deals with information and education needs concerning the feeding of infants, advertising or other forms of promotion to the general public, and standards for product labelling and quality. The Code is currently a discussion paper in SA and has been for several years despite the fact that the government is providing free formula milk to the PMTCT programme.

Experiences in Improving Exclusive Infant Feeding Practices

The question of how best to promote safe infant feeding practices needs attention, particularly in the cultural context of SA where rates of HIV amongst pregnant women are high and mixed feeding is the norm. Unless more effective strategies to address poor feeding practices in both health facility and community settings are found, child mortality will continue to rise.

Experiences in Improving Exclusive Breastfeeding

Exclusive breastfeeding has been found to be an acceptable and feasible feeding option for many HIV-positive women, particularly where practical support is available. Moderate facility-based or community-based support both antenatally and postnatally can significantly increase exclusive breastfeeding rates.

A programme in Cato Manor, Durban has had success in reducing postnatal HIV transmission through support for safer breastfeeding.[34] The programme is delivered by trained counsellors who meet with women antenatally and for those who have chosen to breastfeed, provide information on the initiation of breastfeeding, good lactation management and the importance of exclusive feeding. Mothers continue to attend the clinic until their infants reached 9 months of age. Amongst 188 infants who tested HIV-negative at 6 weeks and continued to be breastfed, 4 tested positive at 9 months

(2.6%). Rates of breast pathology were also low with 2% of mothers diagnosed with mastitis.

Other facility-based approaches such as the BFHI have achieved high rates of initiation of exclusive breastfeeding in hospital but these rates tend to fall without ongoing community-based follow up.[35]

One intervention that has been shown in a variety of settings to increase exclusive breastfeeding is peer counselling. Peer counselling is a proven cost-effective approach for changing behaviour. Several studies have also examined its impact on breastfeeding behaviour. Recent studies have shown that intensive counselling and support can increase the proportion of women who breastfeed exclusively; however, there are considerable variations on the type of counselling support provided. Haider et al.[36] in Bangladesh in a trial randomised by community and Morrow et al.[37] in a trial randomised at individual level in Mexico, obtained substantial increases in exclusive breastfeeding.

A study in Ghana[38] randomised women to one of two intervention groups or a control group. The intervention groups were:

- Exclusive breastfeeding support pre, peri and postnatally, or
- Only peri and postnatally, and
- The control group received non-breastfeeding related health education with an equal amount of contact from counsellors as the intervention groups.

Mothers received nine postnatal home visits in the first six months postpartum and infant feeding data were collected monthly. By six months postpartum, 90% of women in the intervention group 1 and 74% of women in the intervention group 2 had exclusively breastfed in the previous month; only 48% of women in the control group were doing so.

Community-based interventions using local women's groups have also been shown to change behaviour in relation to infant feeding and birth outcomes.[39]

Currently there is a community trial underway in SA to asses the impact of community peer supporters on exclusive infant feeding (either exclusive breast or formula feeding) using a limited intensity home based intervention.

Experiences in Achieving Exclusive Replacement Feeding

Formula feeding has been found to be an acceptable feeding option to many HIV-positive women in urban settings with intensive counselling, adequate water supply and provision of free formula milk.

In SA there have been reports of high rates of adherence to exclusive formula feeding from urban research sites in Khayelitsha and Soweto where women receive free formula milk and regular support at follow up visits. In a randomised trial[40] evaluating the effect of two antiretroviral infant regimens (nevirapine or zidovudine) on peripartum transmission, at week 6 exclusive formula feeding was reported by 84% of women in the nevirapine group and 86% in the zidovudine group.

Evidence from the Good Start study in SA suggests that in the context of minimal support for exclusive breastfeeding, it may be easier to obtain high levels of adherence to exclusive formula feeding. This study[41] found higher rates of adherence to formula feeding than breastfeeding. At 12 weeks, 90% of women who intended to exclusively formula feed reported maintaining exclusive formula feeding whilst only 13% of women who intended to exclusively breastfeed were doing so at twelve weeks. The highest levels of formula adherence were found in the Paarl site that had the highest levels of resources available to women in terms of piped water and electricity. It is important to note that this was an observational study and therefore provides evidence of the challenge of maintaining exclusive breastfeeding with limited or no support.

A study in Abidjan, Cote d'Ivoire[42] provided free formula milk, bottles, sterilising equipment and a drug to inhibit lactation, for 9 months to women who chose not to breastfeed. All mother-infant pairs were closely followed for two years with further infant feeding advice provided at each visit. Eighty per cent of the women who planned to formula feed were doing so at day two postpartum and of the women who planned to exclusively breastfeed half were doing so. Seventy-five per cent of infants were reportedly still receiving only formula at three months. Family pressures were reported as the main reason for changing practice.

Equity Considerations

The HIV and infant feeding dilemma provides a clear example of the disadvantaged position of poor women in developing countries. For an HIV-positive woman living in the USA or Sweden, for example, it would be against the law to breastfeed as a measure of eliminating paediatric HIV. However, in developing country contexts where the resources to ensure safe replacement feeding are not always available to women, the risks and benefits of breastfeeding versus replacement feeding are not as straightforward.

In a middle income country such as SA, it should be a human rights priority that all women have access to clean water, fuel and conditions amenable to disclosure of HIV status in order to enable safe and feasible replacement feeding. The current policy of providing free formula milk to women who choose not to breastfeed with no similar support for women who choose to breastfeed leads to further inequity. This needs to be considered whilst improvements in general community infrastructure to enable more women to safely replacement feed is being addressed.

Conclusions

Both exclusive breastfeeding and exclusive replacement feeding are acceptable and feasible infant feeding options for HIV-positive women depending on the living conditions of the mother. Counselling approaches need to effectively guide women to make informed choices. It should be coupled with support to make these choices viable and sustainable. Interventions are needed to increase HIV status disclosure, which in turn should increase community acceptability of feeding interventions to reduce infant HIV transmission and increase child survival.

Recommendations

The key challenge is to find ways to make feeding safer for infants of HIV-positive mothers and to find effective strategies for supporting women in their infant feeding choices. The following are key recommendations for policy, practice and research:

- Promotion of exclusive breastfeeding for six months as the optimal method of infant nutrition in the general population should be implemented through approaches such as BFHI and integrated management of childhood illness.
- National policies to support safe infant feeding practices need to be urgently ratified in SA including the Infant and Young Child Feeding Policy and the International Code for the Marketing of Breast milk Substitutes.
- The BFHI that support exclusive breastfeeding should be accelerated with targets for BFHI accreditation in all levels of hospitals in each province. This initiative should also support and accommodate formula feeding amongst HIV-positive women who choose this option.
- Greater investment should be made in effective training and continuing support of primary health care workers and lay counsellors to enable them to carry out and sustain quality infant feeding counselling.
- Infant feeding counselling needs to take into account women's personal circumstances and their disease progression.
- Infant feeding support needs to extend into the postnatal period through both facility-based and community-based strategies.
- Further research is needed on the effect of antiretroviral drugs on HIV transmission through breastfeeding.
- Further research is needed on strategies to promote safe early weaning from breastfeeding to minimise the length of exposure to HIV.
- Community level interventions including public IEC campaigns are needed to increase acceptability of feeding practices different from cultural norms (exclusive breastfeeding or replacement feeding).
- The long-term goal of government and society as a whole must be to ensure that all HIV-positive women with infants have the resources to choose and practise safe, feasible, sustainable, affordable and accessible formula feeding.

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