

Symposium: Women's Voices, Women's Choices: The Challenge of Nutrition and HIV/AIDS

Infant Feeding Dilemmas Created by HIV: South African Experiences¹

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ABSTRACT Breast-feeding is a route of HIV transmission from an HIV infected mother to her infant. However, breast-feeding is an important pillar of child survival and part of a mother's womanhood. This paper highlights the dilemma created by the risks and the benefits of breast-feeding and will discuss the implementation in South Africa, of the Safer Breastfeeding Programme, to reduce some of the known risk factors associated with HIV transmission. Operations research was carried out, including infant HIV testing at 6 wk, and 9, 12, and 15 mo. Among 188 breast-fed infants enrolled in the program who were HIV negative at 6 wk, 4 became infected by 9 mo of age (2.6%). Infants enrolled in the Safer Breastfeeding Programme had less breast pathology than is usually reported for HIV infected women. Limited success was attained in promoting heat treatment of expressed breast milk; however, it does appear to be a feasible option after 6 mo of age, and it is believed that mothers would practice it more widely if sufficient promotion and support was given to it. Mothers found it difficult to stop breast-feeding earlier than the norm, and it therefore is important that mothers considering early cessation of breast-feeding be given sufficient preparation and support. *J. Nutr.* 1315: 956–959, 2005.

KEY WORDS: • HIV/AIDS • mother-to-child HIV transmission • women • South Africa

The HIV pandemic has introduced dilemmas for health policy makers and health care workers, and has resulted in a polarization between those whose mandate is preventing the spread of HIV (and therefore would see 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 (1). The biggest dilemma for health care workers is trying to implement the Joint United Nations Program on HIV/AIDS/WHO/United Nations Children's Fund guidelines (2): "When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breast-feeding by HIV-infected mothers is recommended." The difficulty lies in how, in fact, do health workers (and mothers) decide when replacement feeding is acceptable, feasible, affordable, sustainable, and safe? Experience from South African programs set up to prevent mother-to-child transmission of HIV (MTCT) shows that the counseling around infant feed-

ing choices and support for the mother's choice are often suboptimal (3).

Counseling 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 each 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 counselors having a deep understanding of the social issues and the household situation, they need to have the ability to translate complex scientific concepts on risk in a way that is understood by women who may 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 (2).

While working in South Africa, we have realized, unfortunately, that for many HIV-infected women, replacement feeding is not acceptable, feasible, affordable, or safe. The reality is that many women will choose to breast-feed, and our challenge was how then can we make breast-feeding safer for these women?

Making breast-feeding safer for HIV-infected women in South Africa

To make breast-feeding safer, the obvious place to start is to elicit information on what are the risk factors for breast-feeding transmission and then to seek to eliminate or to reduce these risk factors. Table 1 summarizes the current understand-

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TABLE 1

Risk factors for breast-feeding transmission of HIV¹

Strong evidence	Limited evidence
High plasma viral load (7,8)	Nonexclusive breastfeeding in the first 6 mo (13)
Advanced disease/low CD4 count (4,10)	High breast milk viral load (14)
Breast pathology—mastitis, abscesses, cracked bleeding nipples (6,7,10)	Subclinical mastitis as evidenced by increased breast milk sodium levels (15,16)
Primary infection/new infection (11,12)	Low maternal levels of vitamins B, C, and E (17)
Prolonged duration of breastfeeding—more than 6 mo (4)	Infant oral lesions (6)

¹ Numbers in parentheses refer to literature cited in this article.

ing of risk factors for breast-feeding transmission according to the strength of scientific evidence that is available.

The Safer Breastfeeding Programme in Cato Manor, South Africa

During the period January 2000 to December 2003, we introduced the Safer Breastfeeding Programme for HIV-infected women in Cato Manor, Durban, South Africa.

Study site and population. The study site was a primary health clinic in Cato Manor, an informal settlement in Durban, on the east coast of South Africa. The clinic serves a community with a population of about 120,000. Unemployment is very high in the community, with about 80% of the mothers being unemployed. Of the homes, 50% are “informal” in the sense of having no running water, adequate sanitation, or electricity.

The Safer Breastfeeding Programme. The program was largely delivered by trained HIV counselors who also participated in a 10-d WHO/United Nations Children’s Fund breast-feeding course and a 3-d WHO HIV and infant-feeding course. In addition to clinic-based HIV counseling, we also carried out an exclusive breast-feeding promotion campaign for all breast-feeding women in the clinic and the community so all women, not only those who were HIV positive, would be comfortable practicing exclusive breast-feeding for the first 6 mo.

After HIV-positive mothers decided how they planned to feed their child (after counseling), HIV counselors meet with them at least once more to prepare them for feeding in the first week after delivery. For mothers who chose to breast-feed, this included information on the importance of early initiation of breast-feeding, correct infant positioning and attachment to the breast, frequent feeding, exclusivity of breast-feeding, how to prevent and to cope with sore nipples, and how to express milk to avoid breast engorgement. If the opportunity presented at subsequent antenatal visits, the counselor discussed good food choices and nutritional support for the mother.

The components of the safer breast-feeding package were to encourage the following:

- Exclusive breast-feeding up to 6 mo
- Good lactation management (early initiation, attachment, positioning, frequent feeds, learning to express) to avoid mastitis, cracked nipples, etc.
- Shorter duration of breast-feeding—about 6 mo
- Condom use during lactation period
- No feeding from breast with cracked, bleeding nipples or

abscesses (express and discard milk from affected side and continue feeding from unaffected side)

- Prompt treatment of infant oral thrush
- Heat treatment of expressed breast milk

Research design

To better understand how women were responding to the Safer Breastfeeding Programme, we conducted a small operational research study during the initial period of implementation. HIV-positive women were recruited into the study after providing written informed consent and agreeing to attend regular clinic visits, and to allow their infants to give blood samples for HIV testing. The study was approved by the Ethics Board of the Nelson R. Mandela School of Medicine, University of KwaZulu-Natal, South Africa.

Infants attended the clinic at 6, 10, and 14 wk and then again at 9, 12, and 15 mo. Infants were weighed, and morbidity, feeding, and breast health data were collected from their mothers at each visit. Blood samples were taken at 6 wk, and at 9, 12, and 15 mo for PCR testing (6 wk) or for ELISA and p24 antigen testing (9, 12, and 15 mo). In addition, a blood spot was collected at 9 mo, was allowed to dry, and was stored. The blood spot was tested by HIV PCR in the event that the HIV results were inconclusive from the ELISA and p24 antigen testing at 9 mo of age.

It is important to note that this was not a proof of concept study on exclusive breast-feeding and HIV transmission. Such studies are currently being conducted under rigorous conditions in Côte d’Ivoire, South Africa, Zambia, and Zimbabwe. Instead, this was an operational study to understand the influence of promoting safer breast-feeding on feeding behaviors and on HIV transmission in a program context.

Findings

The study included 315 mothers who were enrolled into the MTCT prevention program. Of these 315 women, only 275 infants had HIV status results at 6 wk of age (Fig. 1). We accepted any blood taken between day 35 and 48 as representing a 6-wk sample. Of these 275 infants, 42 were positive (15%). The lower than normal 6-wk transmission rate was probably due to the fact that 72% of the mothers and/or their infants had received one dose of nevirapine according to the Uganda 012 regimen to prevent MTCT of HIV.

Of the 233 infants who were negative at 6 wk, 40 were lost to follow-up or had no HIV test at 9 mo of age, leaving us with 193 infants who had 9-mo HIV results. The 40 who were lost to follow-up had similar baseline characteristics to those who remained in follow-up (data not shown). Of the 193 infants with 9-mo HIV results, 5 infants had never been breast-fed. We therefore had 188 infants who were negative at 6 wk and continued being breast-fed. By international agreement, any transmission after 6 wk of age in a previously negative infant is ascribed to breast-feeding transmission.

Postnatal HIV transmission

Of these 188 infants, 4 tested positive at 9 mo of age (2.6%). Assuming that the risk of postnatal transmission is constant over time (7.5 mo of breast-feeding), the risk of transmission was ~0.35% per month of breast-feeding. The recent Breastfeeding and HIV International Transmission Study meta-analysis of data from several African settings (4) reported that cumulative postnatal HIV transmission (from 4 wk to 18 mo) was consistent over time, and that the monthly

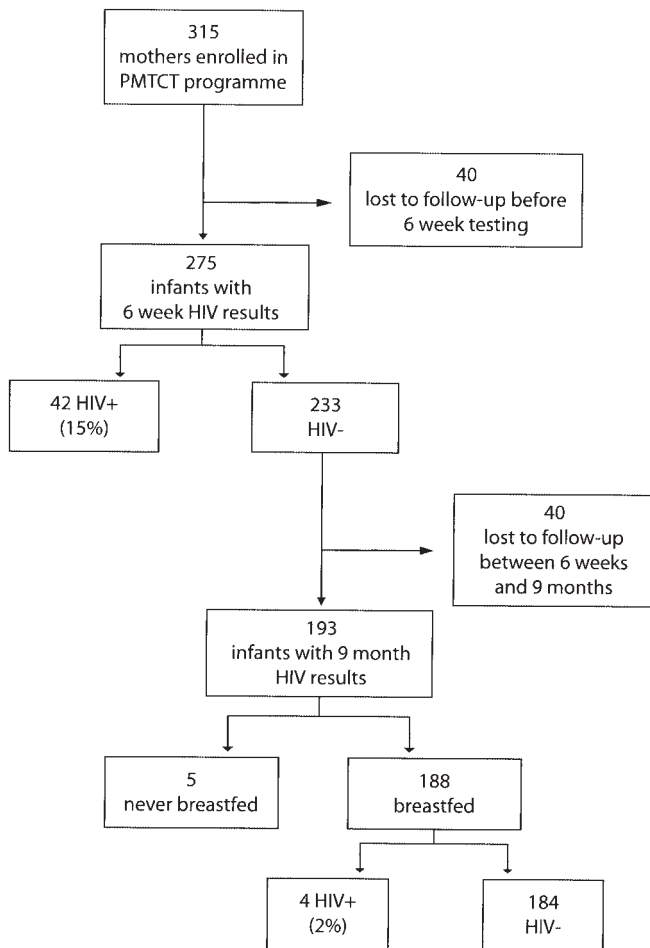


FIGURE 1 Flow diagram of study participants.

risk estimate was 0.74% per month of breast-feeding. The relatively low HIV transmission found in our study suggests that a simple program of promoting safer breast-feeding may have an impact on breast-feeding transmission of HIV. Plus, the gratifying part of this is that the spillover of promoting safer breast-feeding into the HIV-negative community is a positive one, unlike the negative effect of promoting replacement feeding, which has been shown to influence breast-feeding in the HIV-negative community (5).

Breast pathology

Of the 188 mothers who remained in follow-up for 9 mo, we had data on breast pathology in 179 mothers who had been breast-feeding. Cracked nipples were experienced by 21 (12%) mothers [similar to the 11–13% rate quoted by Embree (6) and John (7)]. This was usually in the 1st mo of life and rarely was associated with bleeding. Breast-feeding counselors, either the HIV counselor or another specific breast-feeding counselor, recommended applying pure lanolin ointment and/or breast milk to the affected nipple. If the infant has oral thrush or if nipple candida is suspected, then nystatin ointment is also recommended. The mother is advised to continue feeding from the breast, unless there is obvious bleeding. Mastitis was diagnosed in only 4 (2%) mothers [compared with 7–11% Embree (6) and John (7)]. Mothers were advised to apply warm cloths to the breast to ease engorgement, to express and discard breast milk, but to continue feeding from the unaf-

ected breast. The mother was treated with antibiotics and analgesics.

Use of heat-treated expressed breast milk

Attempts to suggest heat treatment of expressed breast milk (HTEBM) as an option in the first few months of life failed, and mothers felt that it was only a feasible option from 6 mo of age. We had data on milk consumed by 148 infants between 6 and 9 mo of age and found that 56 (38%) received breast milk only, 57 (38.5%) received formula only, 26 (17.6%) received breast milk and formula, and 9 (6%) received HTEBM.

Although mothers participating in earlier focus group discussions had indicated that they would use HTEBM, the counselors were surprised at the low uptake of HTEBM, and, after discussions with mothers, found that the following reasons could explain the reluctance on the part of mothers to use HTEBM: 1) it is not officially endorsed by the Department of Health, with no posters or media coverage about HTEBM; 2) it was felt that a reduced amount of milk is expressed and therefore the baby would not be satisfied; 3) the baby still demanded the breast after a feed—probably for comfort or contact with the mother; 4) there was a lack of confidence in the procedure, because the mothers did not get an opportunity to see a demonstration of the method; 5) it was felt to be stigmatizing, and there was a possibility of it being associated with witchcraft, or too time consuming; and 6) formula is readily available as an alternative.

In response to these comments, the study team will embark on a program of promoting HTEBM by including demonstrations and providing more support to mothers.

Early cessation of breast-feeding

We collected information from 56 mothers who had stopped breast-feeding between 6 and 9 mo. Only 10.7% reported that they had no problems in early cessation. The most frequently cited problem, mentioned by 39% of the mothers, was emotional distress on the part of the mother and/or the baby. The second most frequent problem was engorgement (36%). Other problems cited were stigma and financial problems. When we asked mothers which strategies they had found useful in discontinuing breast-feeding, they reported the following in rank order:

- Expressing breast milk
- Applying chilies or aloes to put child off the breast
- Sending child away or mother sleeping apart from baby
- Binding breasts
- Using cabbage leaves to prevent engorgement
- Using warm cloths to prevent engorgement
- Increasing physical contact and singing to baby
- Taking epsom salts to dry up milk

CONCLUSION

In our Safer Breastfeeding Programme, we observed a 2.6% HIV transmission rate during breast-feeding up to 9 mo. In addition, the program led to mothers experiencing less breast pathology than is usually reported for HIV-infected women. Limited success was attained in promoting heat treatment of expressed breast milk; however, it does appear to be a feasible option after 6 mo of age, and it is believed that mothers would practice it more widely if sufficient promotion and support was given to it. Mothers found it difficult to stop breast-feeding earlier than the norm, and it therefore is important that

mothers considering early cessation of breast-feeding be given sufficient preparation and support. However, care must be taken to ensure that the infant is not nutritionally compromised by the mother's early cessation of breast-feeding.

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LITERATURE CITED

1. Jones, G., Steketee, R. W., Black, R. E., Bhutta, Z. A., Morris, S. S. & the Bellagio Child Survival Study Group (2003) How many child deaths can we prevent this year? *Lancet* 362: 65–71.
2. WHO (2001) New Data on the Prevention of Mother-to-Child Transmission of HIV and their Policy Implications: Conclusions and Recommendations [Online]. Geneva, 11–13 October (2000), approved January 15, 2001. <http://www.unaids.org/publications/documents/mtct> [accessed Feb. 10, 2004].
3. Jackson, D. J., Chopra, M., Doherty, T. & Ashworth, A. (2004) Quality of counselling of women in South African PMTCT pilot sites. Abstract No. ThPeE7998. XV International AIDS Conference, Bangkok, Thailand.
4. The Breastfeeding and HIV International Transmission Study Group (2004) Late postnatal transmission of HIV-1 in breast-fed children: an individual patient data meta-analysis. *J. Infect. Dis.* 189: 2154–2166.
5. Latham, M. C. & Kisanga, O. (2001) Breastfeeding and HIV—A Four Country Study. Abstract No. 3.03.012. 17th International Congress of Nutrition, Vienna, Austria.
6. Embree, J. E., Njenga, S., Datta, P., Nagelkerke, N. J., Ndinya-Achola, J. O., Mohammed, Z., Ramdahn, S., Bwayo, J. J. & Plummer, F. A. (2000) Risk factors for postnatal mother-child transmission of HIV-1. *AIDS* 14: 2535–2541.
7. John, G. C., Nduati, R. W., Mbori-Ngacha, D. A., Richardson, B. A., Panteleeff, D., Mwatha, A., Overbaugh, J., Bwayo, J., Ndinya-Achola, J. O. & Kreiss J. K. (2001) Correlates of mother-to-child human immunodeficiency virus type 1 (HIV-1) transmission: association with maternal plasma HIV-1 RNA load, genital HIV-1 DNA shedding, and breast infections. *J. Infect. Dis.* 183: 206–212.
8. Fawzi, W., Msamanga, G. I., Spiegelman, D., Renjifo, B., Bang, H., Kapiga, S., Coley, J., Hertzmark, E., Essex, M. & Hunter, D. (2002) Transmission of HIV-1 through breastfeeding among women in Dar es Salaam, Tanzania. *J. Acquir. Immune Defic. Syndr.* 31: 331–338.
9. Leroy, V., Karon, J. M., Alioum, A., Ekpini, E. R., van de Perre, P., Greenberg, A. E., Msellati, P., Hudgens, M., Dabis, F., Wiktor, S. Z. & the West Africa PMTCT Study Group (2003) Postnatal transmission of HIV-1 after a maternal short-course zidovudine peripartum regimen in West Africa. *AIDS* 17: 1493–1501.
10. Ekpini, E. R., Wiktor, S. Z., Satten, G. A., Adjorlolo-Johnson, G. T., Sibailly, T. S., Ou, C. Y., Karon, J. M., Brattegaard, K., Whitaker, J. P., et al. (1997) Late postnatal mother-to-child transmission of HIV-1 in Abidjan, Côte d'Ivoire. *Lancet* 349: 1054–1059.
11. Daar, E. S., Moudgil, T., Meyer, R. D. & Ho, D. D. (1991) Transient high levels of viremia in patients with primary human immunodeficiency virus type 1 infection. *N. Engl. J. Med.* 324: 961–964.
12. Dunn, D. T., Newell, M. L., Ades, A. E. & Peckham, C. S. (1992) Risk of human immunodeficiency virus type 1 transmission through breastfeeding. *Lancet* 340: 585–588.
13. Coutoudis, A., Pillay, K., Kuhn, L., Spooner, E., Tsai, W. Y., Coovadia, H. M. & the South African Vitamin A Study Group (2001) Method of feeding and transmission of HIV-1 from mothers to children by 15 months of age: prospective cohort study from Durban, South Africa. *AIDS* 15: 379–387.
14. Rousseau, C. M., Nduati, R. W., Richardson, B. A., Steele, M. S., Johnston, G. C., Mbori-Ngacha, D. A., Kreiss, J. K. & Overbaugh, J. (2003) Longitudinal analysis of human immunodeficiency virus type 1 RNA in breast milk and of its relationship to infant infection and maternal disease. *J. Infect. Dis.* 187: 741–747.
15. Willumsen, J. F., Filteau, S. M., Coutoudis, A., Newell, M. L., Rollins, N. C., Coovadia, H. M. & Tomkins, A. M. (2003) Breastmilk RNA viral load in HIV-infected South African women: effects of subclinical mastitis and infant feeding. *AIDS* 17: 407–414.
16. Semba, R. D., Kumwenda, N., Hoover, D. R., Taha, T. E., Quinn, T. C., Mtshali, L., Biggar, R. J., Broadhead, R., Miotti, P. G., Sokoll, L. J., van der Hoeven, L. & Chipangwi, J. D. (1999) Human immunodeficiency virus load in breast milk, mastitis, and mother-to-child transmission of human immunodeficiency virus type 1. *J. Infect. Dis.* 180: 93–98.
17. Fawzi, W. W., Msamanga, G. I., Hunter, D., Renjifo, B., Antelman, G., Bang, H., Manji, K., Kapiga, S., Mwakigile, D., et al. (2002) Randomized trial of vitamin supplements in relation to transmission of HIV-1 through breastfeeding and early child mortality. *AIDS* 16: 1935–1944.