Improving child health and HIV-free survival

A review of current research on risks and benefits of infant feeding options for HIV-positive moms

PATH/Evelyn Hockstein

INTRODUCTION

International guidelines for HIV-uninfected populations have recommended exclusive breastfeeding to six months with continued breastfeeding to two years. Yet over the past ten years, in response to the HIV epidemic, many HIV-positive mothers have avoided breastfeeding or shortened their usual duration. We reviewed evidence concerning the effect of breastfeeding avoidance and early cessation on infant and young child mortality and HIV-free survival in developing countries.

METHODS

We conducted a literature review by performing PubMed and MEDLINE searches and reviewing citations in publications and international conference abstracts. Search terms included: infant feeding and HIV, exclusive breastfeeding, and formula feeding.

RESULTS

Benefits of exclusive breastfeeding

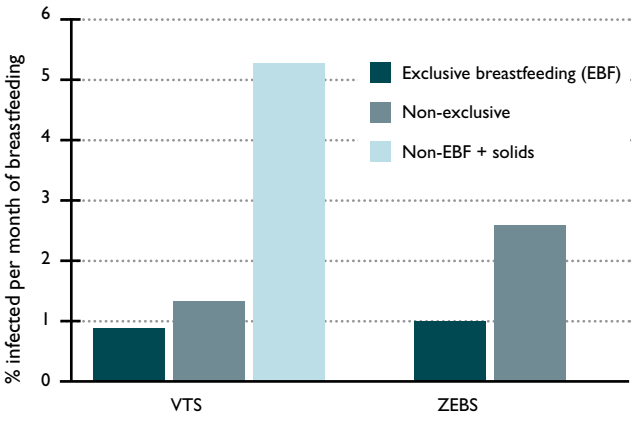
Reduced HIV transmission

Breastfeeding's benefits have long been known for protecting against malnutrition, morbidity, and mortality in infants. Several studies, including the Vertical Transmission Study (VTS) in South Africa and the Zambia Exclusive Breastfeeding Study (ZEBS) (Figure 1), show that exclusive breastfeeding during the first six months of life significantly reduces the risk of HIV transmission in comparison with non-exclusive or mixed feeding.[1–7]

Increased HIV-free survival

A study in Zimbabwe provides the strongest evidence of the role of exclusive breastfeeding in preventing HIV and improving child survival. Investigators found that as the numbers of women who were exclusively breastfeeding increased, HIV infections and deaths declined.[6,7]

FIGURE 1. Postnatal HIV infection of infants 0–5 months by feeding method



Data from Coovadia et al., 2007; Kuhn et al., 2007.

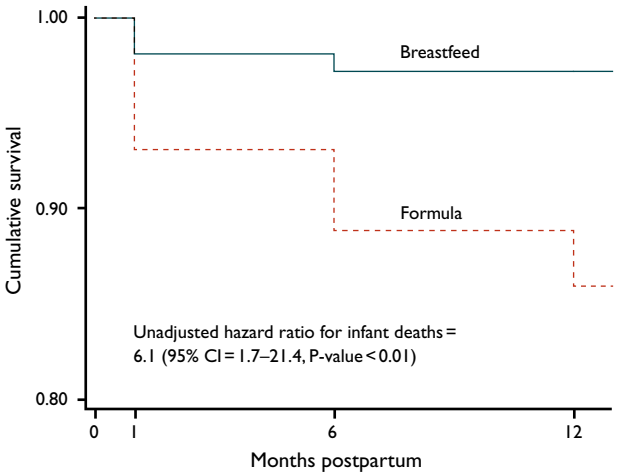
July 2010

Consequences of avoiding breastfeeding

Increased child mortality

Studies in sub-Saharan Africa show that providing infant formula as a way to reduce mother-to-child transmission of HIV increases rates of mortality among children. Clinical trials show two-fold increases in child mortality.[12] In a program in Uganda, the risk of infant mortality increased more than six-fold among women who chose formula feeding (Figure 2).[13]

FIGURE 2. Cumulative probability of survival by feeding method in Uganda

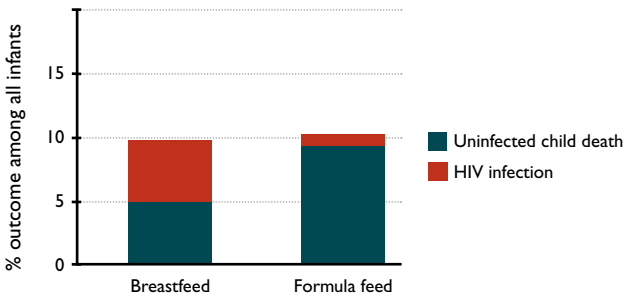


Adapted from Kagaayi et al., 2008.

No benefit for HIV-free survival

Clinical trials indicate that although breastfeeding avoidance reduces HIV transmission, HIV-free survival does not improve due to increased mortality. A study in Botswana demonstrated no benefit for HIV-free survival to six months if women breastfed versus formula-fed (Figure 3),[14] and a study in Uganda actually showed a reduction in HIV-free survival (Figure 4).[13]

FIGURE 3. HIV infection and non-HIV death by feeding method in Botswana



Data from Thior et al., 2006.

Challenges of infant formula

Hygienic preparation. Hygienic preparation is a challenge in many settings, even when safe water is available. A study in South Africa found that 81% of formula feeds were contaminated with fecal matter, even though mothers prepared them correctly.[8]

Adequate and sustained supply. Interrupted supply of formula puts infants at risk of malnutrition and infection. Audits of the South African national formula program have noted serious gaps in supply.[9]

Costs. Very few HIV-infected women in sub-Saharan Africa can afford the high costs of formula. Similarly, the costs are very expensive for prevention of mother-to-child transmission (PMTCT) programs distributing it free or highly subsidized. In South Africa, a report estimated that formula costs made up 24% of the total budget required for PMTCT programs.[10]

Lack of antibodies and other immune factors. Although formula provides critical nutrients, it does not have breastmilk's maternal antibodies to support the development of the infant's maturing immune system. Breastmilk contains these immunologic factors regardless of a mother's HIV status.[11]

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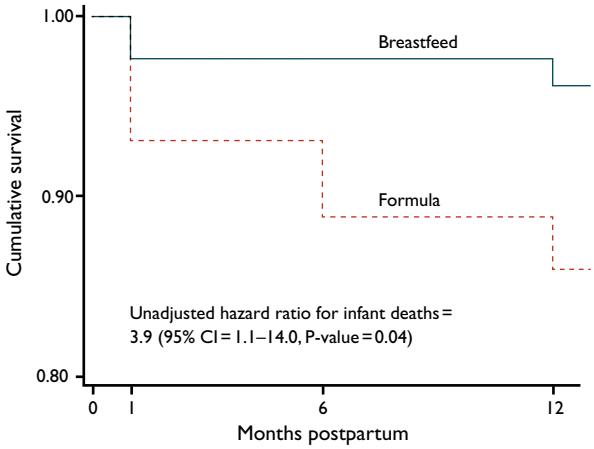
FIGURE 4. Cumulative probability of survival by feeding method in Uganda



Adapted from Kagaayi et al., 2008.

RESULTS

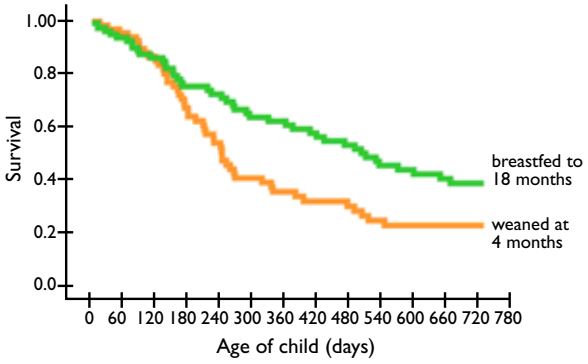
Consequences of early cessation of breastfeeding

Increased child mortality

Early breastfeeding cessation increases the risk of child death. In comparison with historical controls, cessation at around six months was associated with increased mortality (two studies stopped early due to the pronounced effect).[15–17] Secondary analysis from another trial of early cessation showed a three-fold increase in risk of death compared to breastfeeding for 18 months.[18]

A study in Zambia showed that HIV-infected children of mothers encouraged to wean at four months (yellow) were more than twice as likely to die in the following few months as children who continued to breastfeed (green) (Figure 5).[18]

FIGURE 5. Cumulative probability of HIV-free survival by duration of breastfeeding in Zambia



Adapted from Kuhn et al., 2008.

CONCLUSIONS

While avoidance and early cessation of breastfeeding reduce HIV transmission, programmatic and clinical trial evidence suggest that they also increase child morbidity and mortality and provide no net benefit for HIV-free survival.

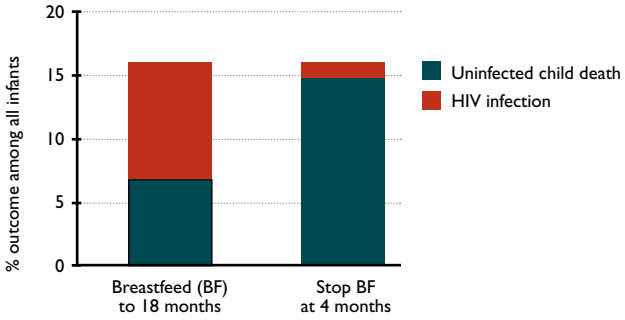
These data were useful in guiding 2009 World Health Organization (WHO) advice recommending continued breastfeeding for all HIV-positive mothers to 12 months in combination with maternal highly active antiretroviral therapy (HAART) if treatment is indicated and antiretroviral (ARV) prophylaxis for mothers or infants while breastfeeding if it is not.

Following these new WHO recommendations will further reduce mother-to-child transmission of HIV, making the advantages of breastfeeding even more pronounced. Even without ARVs, however, the lower mortality and comparable HIV-free survival associated with continued breastfeeding show that it is the safest option.

No benefit for HIV-free survival

The same study in Zambia demonstrated no benefit for HIV-free survival between 4 and 24 months when women weaned at 4 months versus breastfeeding for a usual duration of 18 months (Figure 6).[18] Reductions in HIV infections were cancelled out by increases in uninfected child deaths.

FIGURE 6. HIV infection and non-HIV death by duration of breastfeeding in Zambia



Data from Kuhn et al., 2008.

Recommendations for improved child health

- **Increase support for breastfeeding.** Improve counseling for mothers on infant feeding to promote exclusive and continued breastfeeding, and expand support to mothers.
- **Avoid providing infant formula as a routine part of programs** to prevent mother-to-child transmission of HIV.
- **Strengthen education about complementary feeding.** Promote local, nutritionally adequate complementary foods.
- **Prioritize ARV therapy and prophylaxis among pregnant and lactating women.** Implement programs to provide CD4 count testing to identify pregnant and lactating women in need of ARV therapy. Make extended infant prophylaxis regimens available for women who do not meet criteria for ARV therapy for their own health.
- **Improve coordination between maternal care services and HIV treatment services** to provide mothers with a full package of nutrition and health interventions.

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Louise Kuhn, PhD, of the Mailman School of Public Health at Columbia University, conducted this literature review, originally presented as a poster at the XVIII International AIDS Conference in Vienna, Austrtia, in July 2010.

ABOUT THE INFANT & YOUNG CHILD NUTRITION PROJECT

The Infant & Young Child Nutrition Project is funded by the United States Agency for International Development. The project is led by PATH and includes three partners: CARE, the Manoff Group, and University Research Co., LLC. For more information, please contact info@iycn.org or visit www.iycn.org.

This poster was produced through support provided by the US Agency for International Development, under the terms of Cooperative Agreement No. GPO-00-06-00008-00.The opinions herein are those of the author(s) and do not necessarily reflect the views of the US Agency for International Development.