

Appropriate feeding methods for infants of HIV infected mothers in sub-Saharan Africa

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HIV and AIDS have seriously affected women of reproductive age in sub-Saharan Africa. In 1998, an estimated 590 000 infants worldwide acquired HIV-1 from their mothers; 90% of these infants were in Africa.¹ Transmission of HIV from mother to child mainly occurs in utero and during delivery, but in a few cases it happens through breast feeding.² Increased attention is being focused on strategies to prevent vertical transmission of HIV.³ These strategies need to be based on risk assessment and on cost effectiveness analysis. Interventions are aimed at preventing transmission in utero and during delivery or during breast feeding. Here we discuss only the appropriate infant feeding practices for HIV-1 infected mothers living in poor households in sub-Saharan Africa.

Exaggerated role

In many African countries, the HIV and AIDS pandemic is a major tragedy of unprecedented proportions that is increasingly affecting mothers and their children. However, even responsible health agencies have tended to exaggerate the role of breast feeding in transmission. It is estimated that in countries with a low seroprevalence of HIV (5% of women infected) fewer than 1% of all infants are likely to become infected through breast feeding, whereas in those with a high prevalence (25% of women infected) fewer than 4% of infants will be affected through lengthy breast feeding.⁴

The poverty factor

If preventing a child from acquiring HIV infection through breast milk were the sole consideration, infected mothers would be advised not to breast feed but to give their baby infant formula milk. This is the recommendation generally given to HIV infected mothers in industrialised countries, and this might be appropriate advice for many affluent mothers in non-industrialised countries. However, for infected mothers living in poor households in developing countries it is important to consider very carefully the risks related to not breast feeding and to explore the possibility of alternative feeding methods.⁵

The many disadvantages of artificial feeding have been widely documented, and these apply to all societies and at all levels of affluence and poverty. However, in terms of serious morbidity and mortality, the

Summary points

Concern is increasing over mother to child transmission of HIV in sub-Saharan Africa

Decisions about interventions must be based on assessment of risks, costs, and benefits

The role of breast feeding in the vertical transmission of HIV has been exaggerated

Exclusive breast feeding reduces HIV transmission

Promoting infant formula feeding to prevent HIV infection might increase infant morbidity, malnutrition, and mortality

More research on alternative infant feeding methods is urgently needed

risks are much higher in poor households with inadequate sanitation, unsafe and scarce water supplies, no refrigeration, poor health services, and little knowledge of hygiene. Thus, appropriate advice on infant feeding for an affluent mother infected with HIV might be different to that given to her impoverished counterpart. Distressing though it may be to accept that advice on important health actions can be openly stated to be different for rich and poor people, the grim reality is that the world is plagued by inequity, and the gap between rich and poor people and nations is widening.

Official policies

World Health Organization and Unicef policy recommendations written in 1992 and in place until 1997 are given in the box.⁶ In 1997 UNAIDS, WHO, and Unicef issued a new statement which was published and released to the media in 1998 (see box).⁷

To many people the 1998 statement seemed like a major shift in policy, and the international press took it to mean that United Nations agencies were advising most HIV infected mothers not to breast feed. For example, a front page article in the *New York Times* of 26 July 1998 was headed "AIDS brings shift in UN

Official policies on infant feeding

1992 statement by WHO and Unicef

"Where infectious diseases and malnutrition are the main cause of infant deaths and the infant mortality rate is high, breastfeeding should be the usual advice given to pregnant women including those who are HIV infected. This is because their baby's risk of HIV infection through breastmilk is likely to be lower than the risk of death from other causes if it is not breastfed."⁶

1997 statement by WHO, Unicef, and UNAIDS

"When children born to HIV-infected women can be assured of uninterrupted access to nutritionally adequate breastmilk substitutes that are safely prepared and fed to them, they are at less risk of illness and death if they are not breastfed. However, when these conditions cannot be met—in particular in environments where infectious diseases and malnutrition are the primary causes of death during infancy—then artificial feeding substantially increases children's risk of illness and death. The policy objective must be to minimize all infant feeding risks and to urgently expand access to adequate alternatives so that HIV-infected women have a range of choices. The policy should also stipulate what measures are being taken to make breastmilk substitutes available and affordable; to teach the safest means of feeding them to infants; and to provide the conditions which will diminish the risks of using them."⁷

message on breast-feeding." The article began: "Countering decades of promoting 'breast is best' for infant nutrition, the United Nations is issuing recommendations intended to discourage women infected with the AIDS virus from breast-feeding."

Mixed messages

Unicef, UNAIDS, and WHO subsequently issued three companion documents on "HIV and infant feeding." These laid out options in detail and tried to indicate that the organisations remained very supportive of breast feeding. However, almost simultaneously the bodies announced that they would be conducting training courses and then trials in several African countries. As part of this work, HIV infected mothers would be offered the choice of replacing breast feeding with formula feeding, and perhaps given other alternatives. However, mothers would always be given sufficient information to enable them to make an informed choice.

Questionable wisdom

In 1998, policy makers in African governments and front line health workers were learning—often for the first time—that HIV could be transmitted through breast milk, but they did not know enough to be able to make informed decisions on appropriate action. The situation today is a little different, but it remains confused. We question whether it was wise to change course when so little was known about the feasibility of the different feeding options described in the UNAIDS/WHO/Unicef guidelines and when the disadvantages and harmful outcomes of not breast feeding still applied, or may even have become more serious, in sub-Saharan Africa because of deteriorating economies.

Choices and considerations

The many disadvantages and harmful outcomes of artificial feeding have been widely documented. Most African mothers cannot afford infant formula milk, and even if it is provided free there are often no mechanisms to assure the supply. Equipment, fuel, potable water, time, knowledge, adequate and accessible health care, and education are also needed. If a mother is persuaded or makes her own decision not to breast feed normally as a way of preventing HIV transmission to her infant, alternatives to formula feeding must be considered. These include a modified shorter duration of exclusive breast feeding, heat treating expressed breast milk to kill the virus, use of modified animal milk, or use of breast milk from appropriate donors.⁸ However, inadequate research has been conducted on these alternatives.

Harmful outcomes

A major concern is that formula feeding from the day of birth will increase considerably child morbidity, malnutrition, and mortality. There are no reliable data from poor families in Africa because almost all babies there are breast fed. But data from other developing countries show that mortality from diarrhoea, acute respiratory infections, and other infectious diseases is five or six times higher in infants who are not breast fed than in those who are breast fed for the first two months of life.⁹

A recent study showed that the risk of dying from infectious diseases in the first two months of life is six times greater in infants who are not breast fed than in those who are breast fed.¹⁰ This result was based on a pooled analysis of studies from Brazil, the Gambia, Ghana, Pakistan, the Philippines, and Senegal. It is important to note that in the African studies nearly all



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babies were breast fed into the second year of life, making it impossible to include them in the analyses of infant mortality. The odds ratio of mortality in Pakistan was much greater than 6. Mortality in Pakistan is probably more similar to that in African countries than is mortality in Brazil or the Philippines. The main reason for conducting this research was the dilemma regarding appropriate infant feeding by HIV positive mothers. The authors of this WHO collaborative study concluded: "Our results suggest that it will be difficult, if not impossible, to provide breastmilk substitutes to children from underdeveloped populations." This study was unable to examine relative mortality in infants who had been exclusively breast fed and those who had been partly breast fed in the first few months of life.

Benefits of exclusive breast feeding

The issue becomes important because of a recent study conducted in Durban, South Africa.¹¹ This study showed that the risk of vertical transmission of HIV-1 associated with exclusive breast feeding was considerably lower than that associated with mixed feeding. At 3 months of age there was little difference in the probabilities of HIV infection in infants whose mothers elected to breast feed and in those whose mothers did not breast feed at all. Study infants who received mixed feeding (breast milk plus other fluids) had an appreciably higher risk of HIV-1 transmission than other groups. This is a very important finding. It is believed that the lower transmission rate in exclusively breastfed infants is explained by the facts that these babies probably maintain a healthy gut epithelium, which acts as a viral barrier, and that breast milk contains immune factors that have been shown *in vitro* to have antiviral and anti-HIV effects.^{12 13}

Dangers of poor compliance

All the evidence suggests that mixed breast and formula feeding is the most dangerous feeding option for the young infant. It increases the risks of HIV and other infections. Regimens that support formula feeding as a way of reducing mother to child transmission of HIV need to consider the risks of non-compliance. Even in a sophisticated clinical trial in which urban Kenyan women were assigned to either breast or formula milk feeding groups, poor compliance was reported in the formula group.¹⁴ The report's authors mention that the Nairobi women "often experienced community, family or spousal pressure to breastfeed, and were sometimes concerned about maintaining confidentiality of their HIV-1 status." Thus, it was difficult to ensure exclusive formula feeding, even in mothers who had been carefully counselled and had agreed to participate in an urban clinical trial in which formula milk was provided free. What then is the likelihood of compliance in other places where infant formula is very expensive and more difficult to obtain, piped water is not available, and very limited counselling is possible?

In Zambia, formative research has shown that replacement feeding is not a realistic or affordable option in low income settings, even for literate urban women.¹⁵ Other research suggests that chronic mastitis may play a part in HIV transmission through breast feeding and that measures such as using inexpensive

antioxidant micronutrients might reduce chronic mastitis.^{16 17} In some cases, and in acute mastitis, antibiotics may be needed.

Other factors

Other important consequences must be taken into consideration if HIV infected mothers in Africa are to be recommended not to breast feed. For the individual woman, not breast feeding has implications for fertility.¹⁸ Women who do not breast feed are much more likely than those who do to have an early subsequent pregnancy, and this may place the next infant at risk of HIV and of becoming an orphan.

Of more general concern is the possibility that if large numbers of African women do not breast feed because of fears of HIV transmission there may be a "spill over" effect. Health gains made over the years through efforts to protect, support, and promote breast feeding could be reversed. Where appreciable numbers of mothers opt not to breast feed it is important to carry out studies to evaluate the consequences. Most mothers in Africa either do not know their HIV status or are HIV negative. All of them should be advised to breast feed.

Conclusions

Greatly improved primary prevention of AIDS by means of a wide variety of interventions is an important priority in reducing rates of mother to child transmission of HIV. The availability and use of family planning for mothers infected with HIV will also reduce the number of infected children.

It is recognised that pregnant women have a right to free HIV testing and, if they are found to be positive, to proper counselling about feeding choices for their infants and the risks of each option. Unfortunately, neither of these options is available for most women in Africa. Furthermore, data on the relative risks and benefits of different feeding options are still inadequate.¹⁹ We do not know which option under different circumstances would save the most lives, be the least costly to society, and have the fewest negative effects.

There is clearly a need for intensified research to influence policy. Alternatives to breast feeding, other than formula feeding, deserve more study—in particular, the feasibility of mothers expressing their milk, heat treating it, and then feeding it to their infants.⁸ Although this practice would not be easy, it is not more difficult than safe formula feeding and it provides infants with a superior food, avoids problems of access, is a locally "manufactured" product, and is low cost. More formative research on the feasibility of formula feeding and other alternatives is also necessary.

While we wait for research results, it seems that major efforts to promote exclusive breast feeding would do great good and no harm. Exclusive breast feeding is not widely practised in sub-Saharan Africa, certainly not for as long as six months, which is desirable. Exclusive breast feeding is clearly optimal for mothers who are not infected with HIV. For babies infected in utero, or during childbirth it would be the best feeding method unless the mother was too ill to do this. Furthermore, the data from South Africa suggests that HIV transmission is low in infants who are exclusively breast fed, at least for the first three months.

Because the morbidity and mortality resulting from not breast feeding are higher in the first six months of life than at older ages, consideration might be given to reducing the duration of breast feeding by infected mothers.¹

Answers on infant feeding practices should guide policy makers and health workers in determining the best recommendations to give mothers in areas of sub-Saharan Africa where the prevalence of HIV infection is high. This is essential, not only to minimise the risk of transmission of HIV to infants but also to minimise the high risk of morbidity, mortality, and other problems related to artificial feeding in African families plagued by poverty, illiteracy, and disease.

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Commentary: The feeding debate is still unresolved and of secondary importance

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We believe that the best feeding method for infants whose mothers are HIV positive is still unclear. Randomised trials of feeding interventions in various settings, particularly those studying formula feeding and exclusive breast feeding, are urgently needed to confirm the results from recent observational studies of postpartum transmission in Durban, South Africa.¹ Though the results from exclusive breast feeding seem encouraging, this is seldom practised by women in many sub-Saharan countries and effective interventions to reduce mixed feeding need to be developed and tested. Unfortunately, the recent Kenyan trial of breast feeding compared with formula feeding undertaken by Nduati and colleagues² does not support the results of the Durban study¹ and confirms suspicions that, despite the researchers' best efforts, the Durban study may have been biased by reverse causation.

Complexity, numbers, and complacency

The success of the breast feeding campaigns of the past 40 years has been partly due to the simplicity of their message. This degree of simplicity may no longer be possible in the era of AIDS. Different developing countries, in much the same way as they already tailor public health interventions according to local requirements, will have to make choices about feeding campaigns which take into account their individual health budgets, HIV seroprevalence rates, access to

safe water, stigma attached to formula feeding, and rates of mixed and exclusive breast feeding.³

It may be true that in countries with a high prevalence of HIV, fewer than 4% of all infants can be expected to become infected through breast feeding, but this is still a large number of babies. In South Africa, for example, this means that more than 30 000 infants may be infected through breast feeding each year, and establishing the safest feeding methods for these infants remains a matter of urgency.

We fear complacency, especially where governments are battling to implement a whole range of HIV prevention strategies. The "breast is best again" message is likely to be welcomed by many health departments. This is because it requires no shift in policy and allows them to go back to what they have done for decades now—encourage exclusive breast feeding, but fail in the "exclusivity" part and, by default, encourage mixed feeding. If further studies conclude that exclusive breast feeding confers protection against HIV transmission in some contexts, comprehensive public health campaigns highlighting the importance of exclusive breast feeding will be required.

Feeding a secondary consideration

The debate over feeding methods is important and requires resolution, but we do not believe that feeding methods are critical in preventing vertical transmission

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of HIV. There is a danger that this issue may muddy the waters in respect of methods of reducing mother to child transmission which are already largely resolved—that is, the use of antiretroviral drugs in the perinatal period. While researchers should also assess these interventions in specific contexts, data from South Africa suggest that their impact in reducing paediatric HIV infection could be major, regardless of the mode of feeding.³ Antiretroviral treatments save lives and money and seem to remain cost effective across a wide range of infant mortality, healthcare spending, and screening uptake rates so long as seroprevalence rates are high. Even in mothers who breast feed, the reduction in transmission associated with retroviral treatment is around 38%, and infants may be protected from infection for as long as six months, thus largely nullifying the feeding debate.⁴ More recently, the HIVNET 012 trial showed that single doses of nevirapine given to mother and child were at least as effective as a short course of zidovudine, worked in a breast feeding population, and were substantially cheaper than other regimens.⁵ Aside from the screening of blood products, no known intervention is as effective as perinatal antiretroviral treatment to prevent primary HIV infection. Should we not be addressing the

feeding issue as a secondary one while we concentrate on ironing out the feasibility and implementation problems associated with antiretroviral interventions?

The debate over the relative merits of different feeding methods still awaits conclusive research from intervention trials. In the meantime, let us not delay in reducing mother to child transmission of HIV in ways that can have immediate and substantial effect.

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Modernising the NHS

Patient care (empowerment): the view from a national society

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This week our series on modernising the NHS (in which we are responding to the prime minister's desire to create a national plan for the NHS) covers patient care (empowerment). We asked two people to respond—from different perspectives. In this article Mary Baker writes from her position as chief executive of a prominent national organisation representing people with a specific chronic disease. In the accompanying article on p 1663 Marie Taylor writes as a patient advocate running a local advocacy service.

These two papers form the sixth article in a series of seven

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These are challenging times. People are living longer, and with old age comes frailty and more long term illnesses. At the same time there is a decrease in the availability of informal carers because of the falling birth rate, changes in family structure, and changes in the role of women in society, with more now taking part in higher education and following a career. An urgent need therefore exists to focus more sharply on families affected by chronic disorders so that their needs can be met appropriately. People want to participate in the management of their illness, and we can no longer afford to waste time, scarce resources, and finance. The challenge is to harness the knowledge of patients—and their desire to manage their own condition—to ensure that resources are used wisely and services provided appropriately.

Making partnerships a reality

Firstly, we must turn all the rhetoric about partnerships into a reality. Voluntary organisations can help build bridges to the power bases of central government and

Summary points

The NHS needs to work closely with organisations that represent patients and draw on their knowledge and experience

Information technologies can help marshal information for patients—and for healthcare professionals

Commissioning guidance for specific conditions, drawn up with input from patients as well as professionals, can help ensure appropriate services

Patient groups need to support research of all types, from clinical trials to quality of life surveys

medical and social services. We need to combine the knowledge and clinical observations of healthcare pro-