

Acceptability, feasibility and affordability of infant feeding options for HIV-infected women: a qualitative study in south-west Nigeria

Titilayo C. Abiona*, Adedeji A. Onayade*, Kayode T. Ijadunola*, Perpetua O. Obiajunwa†, Olabisi I. Aina‡ and Lucy N. Thairu§

*Department of Community Health, Obafemi Awolowo University, Ile-Ife, Nigeria, †Department of Paediatrics, Obafemi Awolowo University, Ile-Ife, Nigeria, ‡Department of Sociology and Anthropology, Obafemi Awolowo University, Ile-Ife, Nigeria, and §Center for African Studies, Stanford University, Stanford, CA, USA

Abstract

The objective of this study was to explore the acceptability, feasibility, affordability, safety and sustainability of replacement feeding options for HIV-infected mothers in Ile-Ife, in south-west Nigeria. Six focus group discussions were conducted with a purposive sample of mothers, fathers and grandmothers. The HIV status of all participants was unknown to investigators. All text data were analysed using the Text-based Beta Software program. With regard to the acceptability of replacement feeds, respondents perceived the stigma associated with not breastfeeding to be an important consideration. In this community, breastfeeding is the norm – even though it is not necessarily exclusive. For infected mothers who choose to breastfeed exclusively and then to wean their infants before 6 months of age, respondents did not anticipate early cessation of breastfeeding to be problematic. Respondents noted that acceptable replacement foods included infant formula, soy milk and cow's milk. Barriers to replacement feeding that were mentioned included: the high costs of replacement foods and fuel for cooking; an unreliable supply of electrical power; poor access to safe water; and poor access to storage facilities. The research confirms the difficulty of replacement feeding for HIV-infected mothers in sub-Saharan Africa. The results also provide the basis for new issues and hypothesis for future research in other communities with similar socio-cultural and economic characteristics.

Keywords: acceptability, feasibility, affordability, infant feeding options, HIV infection, Nigeria.

Introduction

The benefits of breastfeeding have been well described in the medical literature (Cesar *et al.* 1999;

Correspondence: Dr Titilayo C. Abiona, P.O. Box 1928, OAU Post Office, Obafemi Awolowo University, Ile-Ife 220005, Osun State, Nigeria. E-mail: titiabiona@yahoo.com; tabiona@oauife.edu.ng

WHO 2000a; Kramer *et al.* 2001). These benefits – including providing optimal nutrition, preventing common childhood illnesses and improving child spacing – are of particular importance in resource-poor countries such as in sub-Saharan Africa. For this reason, the possibility of HIV transmission through breastmilk poses a dilemma, particularly in conditions where breastfeeding is a strong cultural norm,

and where large numbers of women are infected with HIV.

It is estimated that 15% of infants born to HIV-infected women acquire the infection through breastfeeding (DeKock *et al.* 2000). Risk factors for Mother-To-Child Transmission of HIV (MTCT) through breastfeeding include: the duration of breastfeeding; maternal characteristics such as younger maternal age and higher parity; low CD4⁺ count; high peripheral blood and maternal milk viral load; mastitis and breast abscess; infant characteristics such as oral candidiasis; and possibly the pattern and duration of breastfeeding (de Martino *et al.* 1992; Ekpini *et al.* 1997; Miotti *et al.* 1999; Semba *et al.* 1999; Coutoudis & Rollins 2003).

Research has provided some evidence about the risk of HIV transmission according to the pattern of breastfeeding, and has provided additional incentive for consistent and strict definitions of infant feeding patterns (Greiner 2002). The possible association between infant feeding patterns among infants who are breastfed by infected mothers and the risk of MTCT was first evaluated in a prospective study conducted in South Africa (Coutoudis *et al.* 2001). In the study, it was found that, by 15 months of age, the cumulative probability of HIV infection was lower among infants who were exclusively breastfed compared with those who were mixed fed (i.e. those who received other foods and liquids in addition to breastmilk). These findings were later confirmed in Zimbabwe (Iliff *et al.* 2005).

Now, the World Health Organization (WHO) suggests the use of a consistent definitional schema in research, education and training on breastfeeding. These terms and their respective descriptions are outlined in Table 1.

Given the risk of HIV transmission associated with breastfeeding, it would appear that the simplest and most straightforward approach to prevention is to avoid breastfeeding when mothers are infected. This is the recommendation in many parts of the developed world (American Academy of Paediatrics, Committee on Paediatric AIDS 1995). However, a similar recommendation would be difficult for sub-Saharan Africa. First, most women in sub-Saharan Africa breastfeed their infants from birth, and for

Table 1. World Health Organization definitions of infant feeding terms

Infant feeding pattern	Definition
Exclusive breastfeeding (EBF)	Giving the infant no other food or drink, not even water, apart from breastmilk (including expressed breastmilk), with the exception of drops or syrups consisting of vitamins, mineral supplements or prescribed medicines
Mixed feeding	Giving a baby some breastmilk and also any other fluid or feeds, even a teaspoon of water
Replacement feeding	The process of feeding a child who is not receiving breastmilk with a diet that provides all the nutrients the child needs, until the child is fully fed on family foods
Complementary feeding	Giving other foods in addition to breastmilk. These other foods are called complementary foods

well over 2 years. Second, in most parts of Africa, replacement feeding is often associated with an increased risk of morbidity and mortality, in part because poverty constrains the provision of appropriate and safe replacement feeds for children (WHO 2000b).

WHO (2000b) guidelines for infant feeding in the context of HIV recommend the avoidance of all breastfeeding in conditions where foods that can replace breastmilk are 'Acceptable, Feasible, Affordable, Sustainable and Safe'. These conditions are often referred to as the AFASS conditions for replacement feeding. Otherwise, the WHO recommends exclusive breast-feeding up to 3–4 months of age. Thereafter, because the risk of HIV transmission may outweigh the protective benefits of breastmilk, mothers should quickly transition from breastfeeding to replacement feeding (Ross & Labbok 2004). In the HIV and infant feeding literature, this is commonly referred to as 'rapid weaning'.

Rapid weaning poses an additional problem for HIV-infected mothers. Even before the advent of the HIV pandemic, the risk of transition from breastmilk to replacement feeds had been widely recognized. Up to 6 months of age, breastfeeding provides considerable benefits for infant health; however, thereafter,

breastmilk is an inadequate source of nutrition, and it needs to be supplemented with other foods and liquids. With the introduction of weaning foods, infants experience an increased risk of morbidity, particularly when the transition is not well managed, putting them at a high risk of malnutrition and/or infection. This is commonly referred to as the 'weaning dilemma'. Diarrhoea rates have been shown to be highest between the ages of 6 and 12 months, coinciding with the introduction of weaning foods (Pelto *et al.* 2003). There have been relatively few studies investigating the issue of rapid weaning for HIV-infected mothers. Anecdotal reports suggest that rapid weaning is associated with increased mortality, particularly for mothers who do not have adequate weaning foods. However, to these authors' knowledge, there have been no published studies investigating the problem of rapid weaning for HIV-infected mothers.

Aims and objectives of this study

The present study was commissioned by the WHO to investigate the acceptability, feasibility and affordability of infant feeding options for HIV-infected mothers in south-western Nigeria, with a view to developing appropriate infant feeding recommendations for HIV-infected mothers in the area.

Materials and methods

The study was conducted in Ile-Ife. Ile-Ife is a peri-urban community in south-west Nigeria, and has a population of approximately 200 000 (National Population Commission and ORC Macro 2004). It is believed to be the place where the gods first descended on earth, and is considered the ancestral home of the Yorubas of western Nigeria. Today, Ile-Ife is a medium-sized city located in Osun State. It is home to the country's prestigious University of Obafemi-Awolowo and to the Nigeria Natural History Museum. Most people in the area derive their income from farming or from owning small businesses.

Focus group discussions (FGDs) were conducted with the following participants:

- Mothers of unknown HIV status. These participants were recruited from immunization clinics at the Urban Comprehensive Health Centre and the Enuwa Primary Health Care Centre in Ile-Ife. To be eligible to participate, the mothers had to have a child who was under 18 months of age.
- Fathers of unknown HIV status. These participants were recruited through local churches and mosques in Ile-Ife. As with the mothers, to be eligible to participate, the fathers had to have children who were less than 18 months of age.
- Grandmothers. These participants were recruited through local churches and mosques in Ile-Ife. They had to have young grandchildren in order to participate in the FGDs.

A total of six FGDs were conducted with two groups of each type of participant (i.e. mother, father, grandmother). Respondents in each FGD were selected so as to be as similar as possible in terms of socio-economic status and to allow for some descriptive comparison between groups. As two FGDs were conducted with each type of participant, we chose to use a different guide for the two interviews. In the first FGD, we explored attitudes and norms about breastfeeding, complementary feeding, the use of infant formula, perceptions about mothers who do not breastfeed, wet-nursing, expressing of breastmilk, cup and bottle-feeding; and sources of information and advice on infant feeding. We also explored the acceptability of each of the infant feeding options for HIV-infected mothers, namely: exclusive breastfeeding followed by early weaning at around 3 months, exclusive formula feeding, and the use of animal milks such as goat's milk, sheep's milk and camel's milk. The second type of FGD was composed of a discussion based on story-telling. Here, we recounted a narrative in which two HIV-infected mothers chose different infant feeding options (exclusive breastfeeding and exclusive formula feeding). Participants were asked to comment on the women's feeding choices, and to react to the story as it unfolded. In all FGDs, the facilitator and the note-taker were experienced social scientists. They took notes, tape-recorded the discussion, and were responsible for translating the interviews.

Prior to collecting all data, we translated all questionnaires, interview guides and informed consent forms into Yoruba (the local language). Field workers were trained to administer the questionnaire and to conduct FGDs in Yoruba. We pre-tested all research instruments twice before the final questionnaires and the FGD guide were administered to informants.

Ethical approval for the study was obtained from the ethical committee of the Obafemi Awolowo University Teaching Hospitals, Ile-Ife and the Reproductive Health Department of the Federal Ministry of Health. National approval was obtained from the Federal Ministry of Health. Written, informed consent was obtained from each participant prior to data collection.

Focus group discussions were first tape-recorded, translated and transcribed. They were then analysed for content using the Text-based Beta Software. This analysis was conducted independently by two of the authors who are social scientists. Their findings were generally comparable. However, whenever there were discrepancies, these were reconciled by a third party.

In the section that follows, we present results with corresponding tables and figures. As the FGD guide had identified the major themes around which discus-

sions were held, these themes form the basis for the presentation of the results.

Results

The demographic characteristics of the FGD participants are shown in Table 2. Almost all the participants had at least a primary school level of education. Trading was the predominant occupation among mothers and grandmothers, while fathers were mainly artisans. Most of the participants were Christian.

In the section below, we highlight the beliefs related to the infant feeding in the context of HIV/AIDS. These include exclusive breastfeeding followed by rapid weaning, the use of infant formula, the use of animal milks, wet-nursing, and heat treated and expressed breastmilk.

Acceptability, affordability and sustainability of infant feeding options for HIV-infected mothers

Exclusive breastfeeding

Most respondents understood that exclusive breastfeeding means feeding an infant with breastmilk alone. As one father remarked:

Table 2. Demographic characteristics of focus group discussion participants

Characteristic	Mothers (<i>n</i> = 15)	Fathers (<i>n</i> = 17)	Grandmothers (<i>n</i> = 14)
Mean age (range)	28.5 (20–48)	38.2 (25–60)	50.5 (44–63)
Education (%)			
No formal	–	–	4 (28.6)
Primary	4 (26.7)	4 (23.5)	10 (71.4)
Secondary	7 (46.6)	9 (53.0)	–
Post-secondary	4 (26.7)	4 (23.5)	–
Occupation (%)			
Artisan	3 (20.0)	13 (76.5)	–
Trading	8 (53.3)	–	9 (64.3)
Manual worker	1 (6.7)	4 (23.5)	5 (35.7)
Civil servant	3 (20.0)	–	–
Religion (%)			
Christianity	11 (73.3)	15 (88.2)	13 (92.9)
Islam	4 (26.7)	2 (11.8)	1 (7.1)
Parity (%)			
1–2	8 (53.3)	8 (47.0)	4 (28.6)*
3–4	6 (40.0)	6 (35.3)	7 (50.0)*
5 and above	1 (6.7)	3 (17.7)	3 (21.4)*

*Number of grandchildren.

Not all of us follow what the doctor says. Babies should not be given anything except breast milk in the first six months.

However, in practice, participants noted that infants were usually given breastmilk from birth, but that they were supplemented with water and other fluids. In fact, in the sample, only one of the mothers reported having exclusively breastfed her children. This participant stated:

I have three children and I exclusively breast fed them without giving water, for the first six months of their lives!

With regard to giving babies water to drink, participants believed that breastmilk is 'food' and that, just as an adult drinks water after eating, a baby should be given water after being breastfed. One father noted:

We give water, it is not possible to give food without water.

Grandmothers also shared this view. They noted:

Not to drink water? It is not possible!

While respondents believed that breastmilk can be classified as 'food', they did not perceive it to be sufficient as the sole source of nutrition for infants in the first 6 months of life. As one father noted:

We should not deceive ourselves; some children cannot take breast milk alone, they will be crying unless you give other foods.

Common foods given to babies who are less than 6 months include breastmilk, pap made from maize and sorghum mixed with cow's milk or grounded crayfish, soya milk (made from soybeans), plain water, infant formula, glucose water and herbs. Participants agreed that these foods are usually introduced between the ages of 3 and 6 months. Apart from breastmilk, common foods given to infants aged 6 months and above include maize, sorghum pap (sometimes mixed with 'milk' made from soybeans), yam powder ('Amala') and 'Ewedu' (green oily vegetable), and beans.

With regard to exclusive breastfeeding in the context of HIV, some participants believed that infected women should not breastfeed because of the risk of transmitting the virus. In contrast, others had a fatal-

istic attitude. They believed that, if a mother is infected, she would invariably infect the infant. For this reason, she should just go ahead and continue to breastfeed anyway.

Rapid cessation of breastfeeding

In this community, mothers usually wean their infants between 18 and 24 months. While not breastfeeding at all is seen as a taboo in the community, culturally, the early cessation of breastfeeding seems to be acceptable. From discussions conducted using the narrative that compared a woman who had chosen to exclusively formula feed with another who had chosen to exclusively breastfeed, participants had the following reactions to the non-breastfeeding woman:

Mother: 'People will believe she is sick. They will ask her why she is not breastfeeding. She can say she has problems with her breasts or that she has breast cancer'

Father: 'People will easily know that something is wrong with her. She will have to relocate to an area where few people know her'

Grandmother: 'People will be troubled and they will put pressure on her'

In contrast, participants reacted less strongly to the choice of the hypothetical HIV-infected woman breastfeed exclusively and stopped abruptly at 6 months. They said the following:

Mothers [in chorus]: '... There is nothing people will do. She owns her baby, it not other people's business'

Father: 'People may think she made a mistake and had an unplanned pregnancy!'

Grandmother: 'She can wean her baby anytime she feels like, it is her baby'

Choice not to breastfeed

All participants noted that, typically, mothers in the community breastfeed their infants. When asked whether there were any mothers in the community who do not breastfeed, a father responded:

No, it is impossible. Does she want to sell the milk?

A mother participating in the FGD for mothers noted:

There could be mothers who do not breastfeed, but they are foolish. Why do they get pregnant in the first place?

A grandmother remarked:

Why did she decide to be pregnant at all? It does not happen here. She should breastfeed for about 3 months.

Participants had strong reactions to mothers who choose not to breastfeed. Such a mother would be stigmatized. People would perceive her as being wicked, mad or as having loose morals. Participants noted the following:

Mother: 'We will run away from her. We will send her packing; people will think she is mentally derailed'

Father: 'Don't you hear what I said? They are harlots, wicked!'

Grandmother: 'I will send the woman out of my house, if we are both tenants, I will consider her wicked (i.e. uncaring). Why should she do that?'

Only one participant (a grandmother) appeared to have less strong views. This respondent noted that a mother could only be excused from breastfeeding if her breast is infected.

Infant formula

Given the wide-spread poverty in this setting, infant formula is not commonly given to infants. It is only in rare cases – when mothers have the economic means to purchase it – that infant formula is used. Because it is perceived to be a marker of high economic status, sometimes mothers who are not wealthy give infant formula to their babies, in part to prove that they are not poor.

For infants of HIV-infected mothers, the majority of our respondents perceived infant formula to be preferable to exclusive breastfeeding because of the risk of contracting HIV through breastfeeding. They explained that the mother should choose infant formula to reduce the chances of her infant contracting the disease. In addition to concerns about transmitting the virus, participants also thought that infected

mothers may be too sick to be able to breastfeed exclusively. Participants noted:

Mother: 'As AIDS weakens the mother, it will also weaken the baby. The mother will not have enough strength to breastfeed the baby exclusively. She should use infant formula'

Father: 'She can breastfeed exclusively, it depends on how much the disease has destroyed her system, she may be able to breastfeed if the disease is not yet at an advanced stage'

Grandmothers [in chorus]: 'It is not possible for her to breastfeed exclusively!'

However, while participants were concerned about the possibility of transmitting the virus through breastmilk, they knew that infant formula is very expensive and that many mothers would find it difficult to purchase it. Respondents remarked:

Father: 'Infant formula is so expensive; she will just have to find a way since her disease did not allow her to breastfeed'

Grandmother: 'It will not be easy (to buy infant formula) but she has no option'

Wet-nursing

All participants in the FGDs noted that, in the past, wet-nursing was an alternative way of feeding infants whose mothers could not breastfeed. Now, wet-nursing is rare and, when it is practised, it is usually among relations, neighbours ('*where there is love*'), or co-wives. There was the perception that wet-nursing was more likely to occur in communities where people are 'lowly educated' and 'uninformed' as such people would be less likely to understand the possibility of transmitting diseases to wet-nursed infants. When asked what diseases could be transmitted through breastmilk, respondents noted yellow fever and tuberculosis. While respondents mainly disapproved of wet-nursing, they noted that one advantage was that wet-nursing provides a source of food for babies whose mothers cannot breastfeed. In discussing wet-nursing, participants evoked the benefits of breastmilk for the infant. For example, one father noted that because breastmilk promotes the development of the brain, if a child is deprived com-

pletely of breastmilk, his brain would not develop well.

Heat treating expressed breastmilk

The practice of expressing breastmilk and using it to feed babies is not common in the community. Respondents noted that mothers who were formally employed may sometimes express their breastmilk and have the infant's caretaker feed the infant while they are away at work. Typically, the expressed breastmilk is stored in a refrigerator or in a bottle dipped in cold water. None of the respondents had heard about heat treating expressed breastmilk. When the facilitator explained what this entailed, respondents noted that it would not be 'practical' and that heat treating could 'spoil' the milk.

Other replacement feeding options for infants of HIV-infected mothers

Participants proposed the following alternative infant feeding options for mothers who choose not to breastfeed, and who cannot afford infant formula: soya milk (made from soybeans and often mixed with pap) and cow's milk (powdered or evaporated). However, they found 'pap' and milk from goats, sheep or camels to be unacceptable options.

Respondents noted that infant formula was the most suitable alternative to breastmilk because it is specially formulated for infants and its composition is perceived to be close to that of mother's milk. In contrast, they found milk from goats, sheep and camels to be unacceptable, partly because they had never seen the milks used for human consumption. They vehemently disapproved of their use, believing that the animal's characteristics may be transferred to the baby. For instance, one participant noted:

Goats are stubborn animals so children who drink goat's milk may also become stubborn!

Participants also disapproved of the use of pap as an alternate infant food. They noted that, except when it is enriched with cow's milk or infant formula, pap is not nutritionally adequate for young babies.

Another disadvantage perceived by respondents was that pap can get easily contaminated.

Safety and sustainability of replacement feeds

Acceptable replacement foods were said to be available all year round. However, occasional unavailability and high cost of kerosene, the major cooking fuel, and frequent power outage which may affect storage of foods are factors that may affect sustainability.

Respondents noted that few households possessed refrigerators or had access to safe, running water. In addition, they noted that, while most households are connected to a source of electrical power, there were frequent power cuts. Consequently, it would be difficult for mothers to store infant feeds safely in refrigerators.

If needed, respondents suggested that mothers could gain skills in preparing replacement foods from the local health centres. For example, they could learn about the importance of boiling water destined for infant consumption.

Discussion

Guidelines for feeding infants of HIV-infected mothers recommend either exclusive replacement feeding or exclusive breastfeeding in the first few months of life (WHO 2000b). Exclusive replacement feeding removes the risk of post-natal HIV transmission through breastfeeding. However in resource-poor settings such as in sub-Saharan Africa, where there is limited access to safe water and replacement foods, and where breastfeeding is the cultural norm, exclusive replacement feeding may not be acceptable and feasible.

The risks associated with replacement feeding are affected by the local environment and the individual woman's socio-economic status (Habicht *et al.* 1988; Heining & Dewey 1996). To ensure the recommendations are locally acceptable and feasible, the social, cultural and economic factors associated with replacement feeding must be investigated.

In this study, we utilized FGDs to explore normative beliefs and practices in relation to HIV and infant

feeding in one community in south-western Nigeria. We found the FGDs to be useful for gauging the range of opinions, perceptions and beliefs around this particular topic. Because we made sure that the participants felt comfortable in talking with us, and that there were no right or wrong answers, we have no reason to believe that respondents were not telling us the truth as they saw it.

However, the small number of respondents who were purposively sampled may not be representative of the community, and this limits the extent to which we can generalize the results of our study. Additionally, while we made every attempt to ensure that each of the respondents presented their views, as with other group endeavours, some participants tended to be more talkative than others.

In the study, we found that the majority of mothers, fathers and grandmothers who participated in our FGDs could define the term 'exclusive breastfeeding' correctly. But in this community, or even in south-west Nigeria, exclusive breastfeeding is not a common practice. Most infants are given water from birth, in part due to cultural perceptions that infants need water to survive. This cultural practice is deeply engrained. As in other parts of Africa, giving infants water to supplement breastmilk has posed a challenge to the promotion of exclusive breastfeeding. Clearly, to ensure that HIV-positive mothers who choose to breastfeed do so exclusively, beliefs and attitudes in relation to giving infants water need to be addressed.

In this community, while breastfeeding is almost universal and breastfeeding typically continues till 18–24 months, exclusive breastfeeding is not common. Foods and liquids are commonly added to the infant's diet well before he or she is 6 months of age. The most common complementary food used is maize and sorghum pap (at times mixed with 'milk' made from soybeans).

However, in the community, it is not culturally unacceptable not to breastfeed. A mother who does not breastfeed at all will be stigmatized, and will be perceived as being a 'harlot' or even a witch! However, if a mother's breast is infected, she may be excused from breastfeeding. It is significant to note that although not breastfeeding at all is stigmatized,

breastfeeding for short period is not. This finding has significant implications for HIV-infected women who choose to breastfeed, albeit for a short period of time.

As in many other parts of Africa, wet-nursing is no longer common in this community, in part because of fear of transmitting various diseases to the wet-nursed infant. This confirms findings in other settings that wet-nursing may not be culturally acceptable.

Although breastmilk was considered superior to infant formula in terms of its advantages to infants, infant formula was perceived to be the most suitable replacement food. This was, in part, because respondents perceived its composition to be similar to that of breastmilk. However, respondents were aware of the prohibitive costs of purchasing infant formula. The cost of kerosene – which is often used as a household fuel – was also evoked in relation to the preparation of infant formula.

In contrast to infant formula and to cow's milk, milk from animals such as goats, sheep and camels were found to be unacceptable, partly because respondents believed the characteristics of these animals (such as stubbornness) may be transferred to the baby. Heat treating expressed breastmilk and the use of 'pap' were also unacceptable options.

Conclusion

In making recommendations for feeding infants of HIV-infected women in resource-poor communities, the social, cultural and economic characteristics of mothers and families are important factors.

In Table 3, we summarize study results, and the implications of these for programmes and policies.

The local socio-cultural and economic environments of women and families in the context of HIV and infant feeding need to be studied in relation to the WHO infant feeding recommendations. Understanding the socio-cultural and economic circumstances in which HIV-infected women find themselves may lead to better communication between policymakers and women, thus increasing community acceptance of the recommendations. Although the findings of this study can be generalized to most parts of south-west Nigeria which have simi-

Table 3. Study findings and their implications for programmes and policies

Infant feeding method	Summary of finding	Implications for programmes and policies
Exclusive breastfeeding	Beliefs that breastmilk alone is sufficient for the infant's nutrition, mixed feeding is common	Continue promoting the benefits of exclusive breastfeeding in the community
	Beliefs that, when HIV progresses to AIDS, the mother may no longer be able to breastfeed	Address mothers' concerns about their health status, and indicate that breastfeeding is still possible in most cases
Replacement feeding	Mothers who cease breastfeeding early do not risk being stigmatized	Exclusive breastfeeding, followed by rapid weaning, is a viable option for HIV-infected mothers
	Mothers who do not breastfeed risk stigmatization	Support mothers who choose not to breastfeed to help them deal with issues related to stigma
	While infant formula and cow's milk are acceptable, affordability is an issue	Subsidize infant formula or cow's milk or help mothers to improve their economic status (for example, by encouraging them to form micro-enterprises as a group)
	Camel's, goat's and sheep's milk and heat treating expressed breastmilk were not found to be acceptable	Educate mothers about these options to overcome cultural beliefs

lar social, cultural and economic contexts, individual circumstances need to be taken into consideration while counselling HIV-infected mothers about infant feeding.

Acknowledgements

This study was funded by the Child and Adolescent Health Unit, World Health Organization Headquarters Geneva, Switzerland. We would like to express our sincere gratitude to Ellen Piwoz (Academy for Educational Development), and Peggy Bentley (University of North Carolina, Chapel Hill) for helpful suggestions in developing the FGD guides. We would also like to thank Dr Tunde Adegboyega (WHO Nigeria) for his support and encouragement throughout the study period.

References

- American Academy of Paediatrics Committee on Paediatric AIDS. (1995) Human milk, breastfeeding, and transmission of human immunodeficiency virus in the United States. *Pediatrics* **96**, 977–979.
- Cesar J.A., Victora C.G., Barros F.C., Santos I.S. & Flores J.A. (1999) Impact of breastfeeding on admission for pneumonia during post neonatal period in Brazil: nested case-control study. *British Medical Journal* **318**, 1316–1320.
- Coutsoudis A. & Rollins N. (2003) Breast-feeding and HIV-transmission: the jury is still out. *Journal of Pediatrics, Gastroenterology and Nutrition* **36**, 434–442.
- Coutsoudis A., Pillay K., Kuhn L., Spooner E., Tsai W.Y. & Coovadia H.M. (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. South African Vitamin A Study Group. *AIDS* **15**, 379–387.
- DeKock K.M., Fowler M.G., Mercier E., de Vincenzi I., Saba J. & Hoff E. (2000) Prevention of mother-child HIV transmission in resource poor countries. *Journal of the American Medical Association* **283**, 1175–1185.
- Ekpini E.R., Wiktor S.Z., Satten G.A., Adjorlolo-Johnson G.T., Sibailly T.S., Ou C.Y. *et al.* (1997) Late postnatal mother-to-child transmission of HIV-1 in Abidjan, Cote d'Ivoire. *Lancet* **349**, 1054–1059.
- Greiner T. (2002) Research on HIV and breastfeeding: definitions can make all the difference. *Acta Paediatrica* **91**, 615–616.
- Habicht J.P., DaVanzo J. & Butz W.P. (1988) Mother's milk and sewage: their interactive effects on infant mortality. *Pediatrics* **81**, 456–461.
- Heining M. & Dewey K. (1996) Health advantages of breastfeeding for infants: a critical review. *Nutrition Research Reviews* **9**, 89–110.
- Iloff P.J., Piwoz E.G., Tavengwa N.V., Zungaza C.D., Marinda E.T., Nathoo K.J. *et al.* (2005) Early exclusive breastfeeding reduces the risk of postnatal HIV-1 transmission and increases HIV-free survival. *AIDS* **19**, 699–708.
- Kramer M.S., Chalmers B., Hodnett E.D., Sevkovskaya Z., Dzvikovich F., Shapiro S. *et al.* (2001) Promotion of Breast-

- feeding Intervention Trial (PROBIT): a randomized trial in the Republic of Belarus. *Journal of the American Medical Association* **285**, 413–420.
- de Martino M., Tovo P.A., Tozzi A.E., Pezzotti P., Galli L., Livadiotti S. et al. (1992) HIV-1 transmission through breast-milk: appraisal of risk according to duration of feeding. *AIDS* **6**, 991–997.
- Miotti P.G., Taha T.E., Kumwenda N.I., Broadhead R., Mtimavalye L.A., Van der Hoeven L. et al. (1999) HIV transmission through breastfeeding: a study in Malawi. *JAMA: The Journal of the American Medical Association* **282**, 744–749.
- National Population Commission and ORC Macro (2004) *Nigeria Demographic and Health Survey 2003*. National Population Commission and ORC Macro: Calverton, MD.
- Pelto G.H., Levitt E. & Thairu L.N. (2003) Improving feeding practices: current patterns, common constraints, and the design of interventions. *Food and Nutrition Bulletin* **24**, 45–82.
- Ross J.S. & Labbok M.H. (2004) Modeling the effects of different infant feeding strategies on infant survival and mother-to-child transmission of HIV. *The American Journal of Public Health* **94**, 1174–1180.
- Semba R.D., Kumwenda N., Hoover D.R., Taha T.E., Quinn T.C., Mtimavalye L. et al. (1999) Human immunodeficiency virus load in breast milk, mastitis, and mother-to-child transmission of human immunodeficiency virus type 1. *Journal of Infection and Disease* **180**, 93–98.
- WHO (2000a) Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis. *Lancet* **355**, 451–455.
- WHO (2000b) *New Data on the Prevention of Mother-to-Child Transmission of HIV and Their Policy Implications. Conclusions and Recommendations*. UNFPA/UNICEF/WHO/UNAIDS Inter-Agency Task Team: Geneva, 11–13 October.