

## Assessment of knowledge, attitudes and practices of infant feeding in the context of HIV: A case study from western Kenya

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### Abstract

Guidelines for infant feeding options among HIV-positive mothers are changing with informative research. Cultural factors, socialisation processes, gender dimensions and socio-economic status within communities should be considered in recommending feasible and sustainable options. The objective of this study was to assess the knowledge, attitudes and practices with regards to infant feeding in the context of HIV. A cross-sectional study was conducted between November 2003 and January 2004. The study was carried out in Kosirai Division, Nandi-North District, in western Kenya. The target population was community members aged 18 - 45 years and key informants aged 18 years and above. Structured questionnaires and in-depth interviews were used to collect data. Multistage and snowball sampling methods were used to identify study participants. Quantitative data were analysed using the SPSS statistical package for social scientists (Version 12). Cross-tabulations were calculated and Pearson's chi-square test used to test significance of relationships between categorical variables. Recorded qualitative data were transcribed and coded. Themes were developed and integrated. A generation of concepts was used to organise the presentation into summaries, interpretations and text.

A total of 385 individuals participated in the survey, 50% of whom were women. There were 30 key informants. Farming was the main source of income but half of the women (49.7%) had no income. Most of the respondents (85.5%) knew of breastfeeding as a route of HIV transmission with sex ( $p=0.003$ ) and age ( $p=0.000$ ) being highly associated with this knowledge. Breastfeeding was the norm although exclusive breastfeeding was not practised. Cow's milk, the main breast milk substitute, was reported as being given to infants as early as two weeks. It was the most popular (93.5%) infant feeding option in the context of HIV/AIDS. Heating expressed milk, wet nursing and milk banks were least preferred. Thus, the social, cultural and psychological complexity of infant feeding practices should be taken into account when advocating appropriate infant feeding options. Further research is required to determine the safety of using cow's milk as an infant feeding option. Community engagement, including education and awareness strategies, specific to the benefits of exclusive breastfeeding as a mechanism to reduce the risk of HIV transmission is urgently needed.

**Keywords:** HIV, infant feeding, Africa.

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## Résumé

Les directives relatives aux options d'alimentation des nourrissons chez les mères séropositives changent avec les études informatives. Les facteurs culturels, les processus de socialisation, les dimensions de genre et le statut socioéconomique au sein des communautés devraient être pris en considération en recommandant des options faisables et durables. L'objectif de cette étude consistait à évaluer les connaissances, les attitudes et les pratiques relatives à l'alimentation des nourrissons dans le contexte du VIH.

Une étude transversale a été réalisée entre novembre 2003 et janvier 2004. L'étude a été réalisée dans la division de Kosirai, dans le district de Nandi-North, au Kenya occidental. La population ciblée était les membres de la communauté âgés de 18 à 45 ans et les informants clés âgés de 18 ans et plus. Des questionnaires structurés et des entretiens approfondis ont été utilisés pour rassembler les données. Des méthodes d'échantillonnage à plusieurs degrés et cumulatif ont été utilisées pour identifier les participants à l'étude. Les données quantitatives ont été analysées au moyen du logiciel statistique SPSS par les chercheurs en sciences sociales (Version 12). Des tableaux à double entrée ont été calculés et un test  $X^2$  a été utilisé pour tester l'ampleur des relations entre les variables nominales. Les données qualitatives enregistrées ont été transcrites et codées. Les thèmes ont été développés et intégrés. Une génération de concepts a été utilisée afin d'organiser la présentation en résumés, interprétations et texte. Un total de 385 individus a participé à l'étude, dont 50% étaient des femmes. Le nombre d'informants clés s'élevait à 30. L'agriculture était la principale source de revenus mais la moitié des femmes (49.7%) ne disposait d'aucun revenu. La majorité des répondants (85.5%) savait que l'allaitement constituait une voie de transmission du VIH, le sexe ( $p=0.003$ ) et l'âge ( $p=0.000$ ) étant étroitement associés avec ces connaissances. L'allaitement était la norme, bien que l'allaitement exclusif ne soit pas pratiqué. Le lait de vache, principal substitut au lait maternel, a été rapporté comme étant donné aux nourrissons dès l'âge de deux semaines. Il s'agissait de l'option d'alimentation des nourrissons la plus populaire (93.5%) dans le contexte du VIH/SIDA. Le réchauffement du lait tiré, le recours aux nourrices et aux banques de lait, qui n'étaient pas connus, étaient les options les moins privilégiées.

La complexité sociale, culturelle et psychologique des pratiques d'alimentation des nourrissons devrait être prise en compte lors de la préconisation d'options d'alimentation des nourrissons. Des études supplémentaires sont nécessaires afin de déterminer l'innocuité du recours au lait de vache en tant qu'option d'alimentation. L'engagement de la communauté, y compris les stratégies d'éducation et de sensibilisation spécifiques aux avantages présentés par l'allaitement exclusif comme mécanisme pour réduire le risque de transmission du VIH est urgentement recherché.

**Mots clés:** VIH, alimentation du nourrisson, Afrique.

## Introduction

Effective strategies are urgently needed to reduce mother-to-child transmission of HIV through breast-feeding in resource-limited settings. More than 200 000 of the 500 000 new HIV infections that occur each year in children are the result of transmission of the virus through the mother's breast milk (Glenda & Haroon, 2008; WHO, 2006). Infant feeding options which HIV-positive women may consider include replacement feeding, modified breastfeeding and other breast milk substitutes (WHO, 2004). There has however been great debate about what HIV-infected women, or those who live in high-risk areas, should be told about HIV and breast-feeding (Coovadia, Rollins, Bland *et al.*, 2007).

The WHO Consensus Statement on HIV and Infant Feeding (WHO, 2006) highlights critical issues in the continuing debate on whether the HIV transmission resulting from breastfeeding can ever be superseded by the benefits of breastfeeding and therefore justified ethically (Coutsoudis, Coovadia & Wilfert, 2008). Current policies for resource-constrained settings are

guided by evidence that: (1) exclusive breastfeeding for up to six months was associated with a three- to fourfold decreased risk of HIV transmission compared to non-exclusive breastfeeding in three large cohort studies (Coovadia *et al.* 2007; Iliff, Piwoz, Tavengwa *et al.*, 2005, WHO, 2006); (2) where free infant formula was provided, the combined risk of HIV transmission and death was similar whether infants were formula fed or breastfed from birth; and (3) early breastfeeding cessation was associated with reduced HIV transmission, but also with increased risk of morbidity and child mortality in infants born to HIV-infected mothers (Coutsoudis *et al.*, 2008).

HIV-infected mothers are encouraged to select options that best suit their own cultural, economic and physical environment. The decision of whether or not to breastfeed is regarded as a very difficult and complicated choice for women living with HIV/AIDS (De Paoli, Manongi & Klepp 2003; De Paoli, Manongi & Klepp, 2002). In some communities a woman's authority to make infant feeding decisions is undermined by prevailing social and cultural attitudes and perceptions. The choice

involves beliefs about mothering and nurturing, not only the beliefs of the woman but those of her partner, extended family and community (Mtombeni, 2004).

Experience from the field suggests that PMTCT programmes have to some extent neglected infant feeding challenges (Koniz-Booher, Burkhalter, De Wagt *et al.*, 2004). There has been little attention in the literature directed to the views and opinions of community members regarding infant feeding in the face of HIV. Community perceptions concerning the dangers of HIV transmission through breastfeeding and the stigma associated with not breastfeeding make it very difficult for HIV-positive mothers to initiate and maintain optimal infant feeding practices (Chopra & Rollins, 2007). Safe infant feeding in the context of HIV requires communication between parents and the extended family, as well as intensive community education, counselling and support (Israel-Ballard, Maternowska, Abrams *et al.*, 2006).

We therefore initiated this study to assess the knowledge, attitudes and practices regarding infant feeding in the context of HIV, targeting Kosirai Division, Nandi-North District. The Division has only one health centre (Mosoriot Provincial Rural Health Training Centre) providing PMTCT services, and during the time of the study offered free formula milk to HIV-infected mothers at delivery. No primary assessment had been done to determine the feasibility of this option among others, as recommended by WHO. It is hoped that these findings will help to guide health care workers in health facilities, and provide insights for further research that address pertinent issues often neglected in PMTCT intervention strategies.

## Methods

### Study setting

The research was carried out in Kosirai Division, one of the nine divisions in Nandi-North District, Rift Valley Province, in western Kenya. The Division has a population of about 35 976 people.

### Study design

This was a cross-sectional study which was carried out between November 2003 and January 2004.

### Target population

The target population was community members (men and women) of age 18 - 45 years with children under five years. The study considered this age group as highly productive and would therefore be the most affected in the event of HIV infection.

## Sample size

Sample size for focus group participants was derived using the following formula for sample size determination with a 95% confidence interval and a sampling error of 5%.

$$N = \frac{z^2 (p.q)}{d^2}$$

Where:

N is the sample size

z is the statistical constant representing a 95% confidence interval = 1.96

d is the sampling error = 5% or 0.05

p is the possibility of success

q is the probability of failure

p was assumed to be 50% or 0.5 since the prevalence of HIV in the area was not known or documented.

No sample size was calculated for key informants. It was determined *a priori* that 30 key informants would be sufficient to provide adequate information for the study purposes. Key informants were chosen if they were identified as having knowledge of the infant feeding practices in the community.

## Data collection

The study was submitted to Moi Teaching and Referral Hospital Institutional Research and Ethics Committee (IREC) for approval before commencement. Participants were asked to give signed informed consent before participating in the study. The objectives of the study were clearly stated and participation was strictly on a voluntary basis. Participants were informed of foreseeable benefits. Privacy and confidentiality were assured at all times, and participants had the right to withdraw from the study anytime, even after consenting to participate.

Quantitative and qualitative data collection methods were applied. Structured questionnaires were administered to the community members, while key informants interviews were conducted to allow for detailed exploration of knowledge, attitudes and practices of individuals about infant feeding in the context of HIV (See Appendices 1 and 2). The questionnaire and key informant interview guides were developed to be responsive to the objectives of the study. A pilot study was conducted to test the appropriateness of the research tools by the research team, and necessary revisions were incorporated accordingly.

A multi-stage sampling method was used to identify 385 participants required for the survey. Random sampling was employed to select three out of nine locations in the division.

One sub-location and subsequently one village from each of the randomly chosen locations and sub-locations respectively, were then selected. Equal numbers of participants were randomly sampled from the three villages by applying the stratified random sampling method. A total of six strata (males and females of age 18 - 25, 26 - 35 and 36 - 45) were considered to provide equal representation of gender and age group. Systematic sampling was then employed to sample the study participants until the desired sample size was achieved.

A snowballing sampling method was used to identify key informants. This was done by the research team identifying one key informant who in turn helped to identify the rest. Key informant interviews were conducted in Swahili and recorded using a tape recorder. Notes of the proceedings were also taken.

Data from the structured questionnaires were analysed using the computer package Statistical Packages for Social Scientists (SPSS version 12). Variables included age, marital status, level of education occupation, infant feeding knowledge, attitude and practices. Cross-tabulations were calculated and Pearson's chi-square test used to test significance of relationships between categorical variables.

Qualitative data from the key informant interviews were transcribed and translated into English. The data were then coded and themes concerning infant feeding were identified, in order to determine which infant feeding methods were perceived as acceptable, feasible, affordable, sustainable and safe. Themes

from different groups were pooled together and integrated into common themes. This was then followed by the generation of concepts that were used to organise the presentation of the results. The final write up consists of summaries, interpretations and textual excerpts which represent the common themes.

## Results

There were 385 respondents, including 191 (49.6%) women and 194 (50.4%) men, who participated in the survey. In addition, 30 key informants were interviewed to provide additional insights. These included 15 lactating mothers of unknown HIV status, four HIV-infected mothers, six traditional birth attendants, three women community leaders, and two health providers. As summarised in Table 1, the majority of participants were married (93%), and had at least a primary level education. While the majority of men were farmers, the majority of women reported having no formal occupation.

The study revealed that a large proportion (85.5%) of respondents knew of breastfeeding as a route of HIV transmission. A higher number of women (91.1%) compared with men (79.4%) were knowledgeable ( $p=0.001$ ). Age was highly significant ( $p=0.001$ ), with a greater number of older respondents reporting HIV transmission through breastfeeding. Level of education was also highly significant: the higher the level of education the greater the probability of reporting this mode of HIV transmission ( $p=0.001$ ).

**Table 1. Demographic data of respondents**

	Male N=194	Female N=191	Total N=385	p-value
<b>Age</b>				
18 - 25	63 (16.4%)	70 (18.2%)	133 (34.5%)	0.685
26 - 35	67 (17.4%)	61 (15.8%)	128 (33.2%)	
36 - 45	64 (16.6%)	60 (15.6%)	124 (32.2%)	
<b>Marital status</b>				
Single	0 (0%)	8 (4.2%)	8 (2.1%)	0.001
Married	191 (98.5%)	168 (88%)	359 (93.2%)	
Divorced	0 (0%)	7 (1.8%)	7 (1.8%)	
Widowed	3 (1.5%)	8 (3.7%)	11 (2.9%)	
<b>Level of education</b>				
No education	7 3.6%	4 2.1%	11 (2.9%)	0.001
Primary	95 49%	61 31.9%	156 (40.5%)	
Secondary	77 39.7%	95 49.7%	172 (44.7%)	
Tertiary	15 7.7%	31 16.2%	46 (11.9%)	
<b>Occupation</b>				
None	1 (0.5%)	95 (49.7%)	96 (24.9%)	0.000
Farming	111 (57.2%)	43 (22.5%)	154 (40%)	
Business	52 (26.8%)	26 (13.6%)	78 (20.3%)	
Formal	30 (15.5%)	27 (14.1%)	57 (14.8%)	

**Table 2. Women's and men's infant feeding preferences**

Preferred infant feeding option	Female N=191	Male N=194	Total N=385	p-value
Cow's milk	171 (89.5%)	189 (97.4%)	360 (93.5%)	0.002
Goat's milk	42 (22%)	61 (31.4%)	103 (26.8%)	0.036
Sheep's milk	9 (4.7%)	21 (10.8%)	30 (7.8%)	0.025
Infant formula	98 (51.3%)	62 (32%)	160 (41.5%)	0.000
Exclusive breastfeeding for 3 months	45 (23.6%)	14 (7.2%)	59 (15.3%)	0.000
Heating expressed breast milk, wet nursing, milk banks	5 (2.6%)	7 (3.6%)	12 (3.1%)	0.396

To identify infant feeding practices in the community, respondents of unknown HIV status were asked about their usual infant feeding practices. Breastfeeding was found to be the norm. Most women (94.2%) reported that they breastfed their infants from birth. According to the traditional birth attendants, the only time when breastfeeding is not allowed is when the mother is either on medication, or does not have adequate breast milk, or is pregnant, hence the need to preserve milk for the baby she is expecting. Cow's milk was given as early as two weeks, depending on whether the mother had an adequate supply of breast milk.

Half (51.9%) of the respondents had come across a mother who does not breastfeed (59.2% of women and 44.8% of men). When asked which breast milk substitute the mothers used, most (78.2%) of them claimed that they saw the mothers using cow's milk as opposed to infant formula (19.9%), and others porridge and fruits (2%).

Respondents were hypothetically asked what they would recommend for their infants in the event of HIV infection. Only 3.6% (3.1% of the women and 4.1% of the men) would discourage breastfeeding, because they believed infection would have already occurred in the mother's womb. Merely 1% of the respondents were not sure what they would do. Most (93.5%) of the respondents reported that they would alternatively prefer cow's milk to any of the recommended options. A high proportion of men preferred animal milk (cow's, goat's and sheep's milk) and women tended to favour infant formula and exclusive breastfeeding for three months (Table 2).

### Cow's milk

Cow's milk was perceived to be the most available, affordable and commonly used feeding method to supplement the infant's diet. Infants are given cow's milk as early as two weeks. Following this, respondents were asked whether cow's milk should be modified for infants. Although most (90.1%) respondents believed that it was necessary to modify cow's milk by adding water before giving it to the infants, they were not clear on how this should be done.

Others believed that adding water would cause the infants to become constipated. A key informant narrated:

*I give my infant cow's milk without modifying it. People say that if you add water it will make the child's stomach hard. Then when the child goes for a long call [the colloquial term for a bowel movement], the stool becomes hard. Am not sure whether that is right but I don't add water myself.*

Others believed it depended on the age of the cow. A key informant said:

*It depends on the way you feed your child. But I believe if it is milk from a young cow you can give your child the milk without adding water but if it is from a mature cow you should add a little water.*

### Goat's and sheep's milk

All the respondents who did not prefer these two options claimed that both have lots of fats and an unpleasant smell, and were therefore not appropriate for infants.

### Infant formula

Respondents who preferred infant formula gave various reasons for their preference. These reasons included: 42.5% available, 19.4% culturally acceptable, 13.1% affordable, 2.5% free from HIV, and 0.6% easy to prepare. Most (84%) of those who did not prefer infant formula thought the milk was too expensive and not nutritious.

### Exclusive breastfeeding for three months

Those who did not prefer this method reported that it was not possible to exclusively breastfeed for three months because the infant would not be satisfied:

*...will the child really get satisfied? That method! ... I do not see as if it is nice.*

### Heating expressed breast milk

Respondents generally thought it was impossible to destroy the HI virus by heating infected breast milk:

*Expressing and heating! Now heating! ... You know, I do not even know how many HIV viruses are in breast milk. The thing is, the virus is invisible and you cannot tell whether when you heat, all HIV viruses will die ... sometimes people say boil the milk like you are boiling water to destroy insects. I do not think that is true for breast milk.*

### Wet nursing

Respondents who preferred wet nursing stated that breast milk was nutritious. However, they also reported that they would only adopt this option with a relative or people they trusted:

*If it is with another mother like my sister ... I can use this method. But if it is milk from someone else, I cannot ... because I don't trust them.*

### Milk banks

Generally, most of the respondents were shocked to hear that women express and donate their breast milk. Concerns were then raised on how to differentiate expressed breast milk and cow's milk at the market. A key informant narrated:

*I don't think this method should be advocated because we would not know the difference between cow's milk and breast milk. Can you really differentiate between the two when you go to the market? Can you identify milk from another woman in the market? No, I don't think so.*

Four HIV-infected mothers receiving free formula milk at the health centre were interviewed, and reported that they had no problem with the milk. However, cases of non-compliance to formula milk had been reported among them. According to the health providers, this was mostly evident among discordant couples, where the husband was negative and the wife positive. Husbands in this case forced their wives to breastfeed because they feared being stigmatised. Other cases were due to lack of transport to collect the formula milk, as most infected mothers stayed far from the health centre.

Health providers stated that they only advised mothers to use infant formula or exclusively breastfeed for three months. This was mainly because they feared that the mothers would mix feeding if given a variety of options. Furthermore, formula milk was provided free at the clinic, hence it was perceived as the most available and affordable option.

During an interview with one of the infected mothers, the researcher observed that the mother was tempted to breastfeed following her infant's cries of hunger. The mother became conscious of the presence of the researcher, and requested some time to soothe her baby. The researcher also noted that the mother had not brought any formula milk for her baby, yet she claimed to have had an adequate supply of the milk at home.

According to 35.7% (10 out of 28) of the key informants, there were cases of infected mothers breastfeeding after being advised not to:

*I was told of a mother who was counselled not to breastfeed her infant because she was infected ... I am not aware of which infant feeding option she adopted. One day she gave her infant breast milk and she was quarrelled with by some community members. They claimed she was infecting her infant. The infant is now dead ... Maybe her baby would still be alive if she did not breastfeed.*

In addition, three of the infected mothers interviewed reported that they had not told their immediate family about their status, for fear of stigmatisation. One of the key informants reported:

*Our parents are at home ... I do not get any help from them ... I have not told them about my HIV status. I have not even gone back to my village. When I came to the clinic and I was told that I was infected, I kept it to myself because I knew if I told my parents especially my mother, she would get a heart attack. I told myself I would rather keep it from them and when I get very sick I will disclose to them. This is only when am down but as long as am still strong and walking; I don't see the need to frighten my mother.*

## Discussion

Our findings indicate that a high percentage of respondents were aware of breastfeeding as a route of HIV transmission. It was evident, however, that there was a lack of knowledge about the range of infant feeding options, limiting their choices and hence preferences. It is therefore important that communities are sensitised regarding infant feeding options available in their settings, so that they can widen their range of choices. This is particularly pertinent now that recommendations regarding infant feeding practices are in support of exclusive breastfeeding when safe water is not reliably available.

As expected, in most African settings, breastfeeding was considered the norm. However, exclusive breastfeeding for four to six months was neither practised nor favoured. Breastfeeding behaviour was found to be influenced by the community

through its collective norms for what a 'good mother' is, and for her baby's health (Coovadia *et al.*, 2007). In addition, stigma associated with not breastfeeding was apparent and HIV-positive mothers were reported to be practising mixed feeding. Women are normally pressured to justify reasons for not breastfeeding. The reasons considered acceptable by the community are breast diseases, cancer, insufficient milk, work and pregnancy (Mtombeni, 2004; Pool, Nyanzi & Withworth, 2001).

It is noteworthy that although free infant formula was advocated by the local health care facility, no formative or preparatory study had been conducted to determine the feasibility and acceptability of the option. This resulted in cases of non-compliance and mixed feeding, due to the stigma associated with the use of formula milk, thereby increasing the risk of death among infants (WHO, 2006). An important study in Botswana revealed that even providing replacement feeding at no cost led to infants being 50 times more likely to die of diarrhoeal disease compared with those who were breastfed (Creek, Arvelo, Kim *et al.*, 2006).

Community members reported that they would adopt alternative infant feeding options in the event of HIV infection. Likewise, a study in Tanzania found that despite a local culture strongly supportive of breastfeeding, women participating in this study reported that they would change to an alternative infant feeding method if they were found to be HIV-infected and were advised to do so (De Paoli, Manongi & Klepp, 2003).

The community had strong views about the recommended infant feeding. Although breastfeeding was the norm, exclusive breastfeeding for four to six months was considered inadequate for infants. Mothers rarely practised exclusive breastfeeding, and gave their infants other foods as early as two weeks. This has major implications for current infant feeding guidelines. Intensified community education and awareness campaigns explaining the benefits of exclusive breastfeeding for infants at risk of HIV in settings without safe water are essential.

Cow's milk was considered the most favourable because it was perceived to be acceptable, available and affordable. Yet the concept of modifying the milk to make it nutritious without compromising safety was not well understood, raising concerns of a greater risk of death among infants from diarrhoeal diseases. WHO no longer recommends home-modified animal milk as a replacement feeding option to be used for all of the first six months of life, because it does not provide all the nutrients that an infant needs (WHO, 2006). This raises enormous challenges, given that cow's milk was the most preferred option identified by community members.

Heating expressed breast milk, wet nursing, and milk banks were the options least preferred. While no longer considered a main infant feeding option, heat treatment of expressed breast milk may be feasible for some women, especially after the baby is a few months old and during weaning (WHO, 2006). Heat-treated expressed milk of HIV-positive mothers will not transmit HIV, and remains nutritionally and immunologically superior to infant formula (Chantry, Israel-Ballard, Moldoveanu *et al.*, 2007). However, most of the participants did not believe that the virus could be destroyed in this manner.

Wet nursing can be considered in communities where this option is practised (WHO, 2004). Nevertheless, this was not a common practice in the study population, and was only appreciated by a few family members. Despite the fact that donor milk could be recommended where a milk bank is already functioning according to recognised standards (WHO, 2003), this was not the case in Kosirai. The option was perceived as culturally unacceptable, highlighting the need to understand communities' perceptions about infant feeding options before recommending their use.

The study revealed that women were not culturally or economically empowered to make decisions regarding infant feeding, and consequently their choices were influenced by the community around them. Men preferred animal milk to any other option and, being the main decision makers and breadwinners, it could be assumed that they would be most likely to impose their preference on their partners. A study conducted in Mombasa, Kenya, showed that partner involvement is crucial in postpartum MTCT (Mwanyumba, Quaghebeur & Wim, 2002). Male involvement through couple counselling, with an emphasis on safe feeding practices, should be encouraged to promote adoption of feasible options.

With participatory tools, communities can introduce HIV/AIDS as a collective responsibility, and build consensus that infant feeding is a community concern. This may increase uptake of HIV testing, reduce stigma and violence, and boost male involvement, in addition to reducing new infant transmission (Cohen, Pathesarathy, & Venkatasubramanian, 2002). Community dialogue and provision of adequate information are crucial to encouraging and sustaining participation in prevention programmes, as well as the overall success of infant feeding programmes. It also provides a unique opportunity for both community members and programme managers in non-governmental and other community-based organisations to gain information, and consider the complex challenges faced in recommending appropriate infant feeding policies. The findings

of this study provide insight into the roll-out of the revised infant feeding guidelines that now recommend exclusive breastfeeding for six months: if it is to be successfully used by the community, the community must be engaged.

### Limitations

Culture and geography greatly influence individuals' views and opinions. Therefore the study can only be generalised to Kosirai Division, and is not representative of the diverse ethnic communities in Kenya and elsewhere in sub-Saharan Africa. The study was also biased during sampling because there was an equal representation of respondents from the selected three villages without consideration of the total population of each village.

### Conclusions

How to promote breastfeeding as the intervention of choice to improve infant survival considering all the risks and alternatives is a question that plagues mothers, caregivers and programme managers (Jones, Steketee, Black, Bhutta, & Morris, 2003; Glenda & Haroon, 2008). This is greatly complicated by the radical shift away from recommendations to formula-feed infants at risk of acquiring HIV. Evidence shows that communities play a vital role in providing a supportive and enabling environment for HIV-positive women, and hence the infant feeding choice they adopt. Efforts should be directed towards formulating sound infant feeding policies that consider the views and opinions of community members. It is with this in mind that PMTCT programmes should begin with participatory and formative work to ascertain how community norms will affect attitudes and behaviour regarding HIV/AIDS and PMTCT uptake. In this study, cow's milk was found to be the most preferable option, and therefore further research on the feasibility of this option in the area is required. The need to sensitise the community about other options, and especially the benefits of exclusive breastfeeding, which is associated with a decreased risk of HIV transmission in resource-restrained settings, is paramount. In order to implement effective programmes and policies, more emphasis is needed on community education, community capacity development, and community support for infant-feeding activities.

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## APPENDICES

### Appendix I: Questionnaire for community members

I am a student of MPH Moi University. I would like to thank you for agreeing to participate in this study. The aim of the study is to determine community perspectives on infant feeding options for HIV infected mothers. Please feel free to ask questions during and after the interview. Thank you.

Serial No.....

#### Personal Information

Division:.....

Location:.....

Sub-location:.....

Age:.....

Sex:  Male  Female

Number of children:.....

Marital status:  Single  
 Married  
 Divorced  
 Widowed

Level of education:  Primary level  
 Secondary level  
 Tertiary level  
 None

Occupation:  Formal employment  
 Business  
 Farmer  
 None

#### Knowledge on infant feeding options for HIV positive women

1. (a) Can infants get infected with the HIV virus through breastfeeding?

Yes  No  Don't know

(b) If no give reasons

Infant has already been infected  
 Infant can not be infected  
 Milk is the best food all infants  
 Other specify.....

2. (a) Are you aware of the Prevention of Mother to Child Transmission of HIV (PMTCT) programme at Mosoriot?

Yes  No

(b) If yes, what do they do?.....

3. What advice is usually given to HIV positive mothers in terms of infant feeding?

Not to breast feed  
 I don't know  
 Others specify.....

4. (a) Are you aware of the alternative infant feeding options recommended for HIV positive mothers?

Yes  No

(b) If yes, which alternative infant feeding options are you aware of?

Cow's milk  
 Goat's milk  
 Sheep's milk  
 Infant formula  
 Exclusive breastfeeding for 6 months  
 Heating expressed breast milk  
 Wet nursing  
 Milk banks  
 Other (Specify).....

(b) How did you get to know about these infant feeding options?

Doctors  
 Traditional birth attendants  
 Mother in-law

**Appendix I: Questionnaire for community members – continued**

- Mother
- Elderly women
- Friends
- Other (Specify).....

**Infant feeding practices**

5. (a) Do you start breastfeeding immediately/ Does your partner start breastfeeding immediately?

- Yes
- No
- Don't know

(b.) If infants are breast-fed, for how long do you breast-feed/for how long does your partner breast-feed?

- Over 2 years
- For 2 years
- For 6 months
- For 3 months
- For as long as the mother has adequate breast milk
- Don't know
- Other (Specify).....

(c.i) Give reasons why infants are not breast fed immediately after birth

- Doctor's advice
- HIV infection
- Colostrum is not good for the baby
- No breast milk output
- Other (Specify).....

(c.ii) What alternative infant feeding do you give your infant/ What alternative infant feeding does your partner give your infant?

- Cow's milk
- Goat's milk
- Sheep's milk
- Infant formula
- Water
- Porridge
- Mashed solid foods
- Other (Specify).....

6. (a) What else do you give your infant/ What else does your partner give your infant?

- Breast milk
- Cow's milk
- Goat's milk
- Sheep's milk
- Infant formula
- Water
- Porridge
- Mashed solid foods
- Other (Specify).....

(b) When do you introduce this/ When does your partner introduce this?

- 6 months
- 3 months
- When the baby refuses breast milk
- When a mother has inadequate or no breast milk
- When a mother is sick
- Don't know
- Other (Specify).....

7. When do you introduce solid foods?

- 6 months
- 3 months
- When the baby refuses breast milk
- When a mother has inadequate or no breast milk
- Don't know
- Other (Specify).....

**Appendix I: Questionnaire for community members – continued**

8. Who gives advice on the appropriate infant feeding method?

- Doctors  
 Traditional birth attendants  
 Mother in-law  
 Mother  
 Elderly women  
 Other (Specify).....

9. (a) Are there cases when a mother is not allowed to breast-feed from birth?

- Yes                       No                       Don't know

(b.i) If yes when?

- When a mother is sick  
 When a mother has breast infections  
 When a mother has HIV infection  
 Other (Specify).....

(b.ii) What breast milk substitutes are then advised?

- Cow's milk  
 Goat's milk  
 Sheep's milk  
 Infant commercial formula  
 Porridge  
 Other (Specify).....

10. What is normally said of a mother who does not breast-feed from birth in the community?

- Prostitute  
 Uncaring mother  
 I don't know  
 Other (Specify).....

11. (a) Are mothers with cracked nipples allowed to breast-feed?

- Yes                       No                       Don't know

(b) If no, what breast milk substitutes are advised?

- Cow's milk  
 Infant formula  
 Water  
 Porridge  
 Mashed solid foods  
 Other (Specify).....

12. (a) Does the father of the infant have a role to play in deciding the appropriate infant feeding method?

- Yes                       No

(b) If Yes please state the role.....

13. (a.i) If you do not breast-feed, would your partner get to know this? (women)

- Yes                       No

(a.ii) Do you think he will have any problem with that?

- Yes                       No                       Don't know

(b.i) If your partner does not breast-feed would you get to know this? (men)

- Yes                       No

(b.ii) Do you think you will have any problem with that?

- Yes                       No                       Don't know

14. (a) Have you come across a mother in this community who does not breast-feed her infant?

- Yes                       No

(b.i) If yes what was she using?

- Cow's milk  
 Goat's milk  
 Sheep's milk  
 Infant formula

**Appendix I: Questionnaire for community members – continued**

- Exclusive breastfeeding for 6 months
- Wet nursing
- Milk banks
- Other specify.....

(b.ii) What was the reason for not breastfeeding?

- Doctor's advice
- HIV infection
- No breast milk output
- Crying baby
- Baby refuses breast milk
- Other (Specify).....

**Perceptions of infant feeding in the context of HIV**

15. (a) If you/your partner were infected with the HI virus would you continue breastfeeding?

- Yes                       No                       Don't know

(b) If yes, give reasons why you would opt to continue breastfeeding

- Not culturally acceptable
- Not nutritional
- Expensive
- Unhygienic
- Other specify.....

\* Explain the different infant feeding options

16. (a) Which of the infant feeding options are you aware of?

- Cow's milk
- Goat 'smilk
- Sheep's milk
- Infant formula
- Exclusive breastfeeding for 6 months
- Wet nursing
- Milk banks
- Other specify.....

17. (a) Which of the infant feeding options would you prefer and why?

**KEY:**

[C] Culturally acceptable [E] Easily accessible [A] Affordable

<b>C</b>	<b>E</b>	<b>A</b>	<b>O</b>
Cow's milk			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Goat's milk			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Sheep's milk			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Infant formula			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Exclusive breastfeeding for 6 months			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Heating expressed breast milk			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Wet nursing			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Milk banks			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....

**Appendix I: Questionnaire for community members – continued**

(b) Give reasons for the methods not preferred

**KEY:**

[NC] Not culturally acceptable [NN] Not nutritional [EX] Expensive [U] Unhygienic [O] Other specify.....

	<b>NCNN</b>	<b>EX</b>	<b>U</b>	<b>O</b>
Cow's milk	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Goat's milk	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Sheep's milk	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Infant formula	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Exclusive breastfeeding for 6 months	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Heating expressed breast milk	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Wet nursing	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....
Milk banks	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> .....

18. Which of the following methods would be easily acceptable in the community?

- Cow's milk
- Goat's milk
- Sheep's milk
- Infant formula
- Exclusive breastfeeding for 6 months
- Heating expressed breast milk
- Wet nursing
- Milk banks
- All the above
- Other (Specify).....

19. (a) Do you think HIV positive women need support?

- Yes  No

(b) What kind of support do you think should be given to HIV positive mothers?

- Financial support
- Adequate supply of formula milk
- Moral support
- Other (Specify).....

20. Would you support a HIV infected mother/wife who has been advised not to breast-feed?

- Yes  No  Don't know

Give reasons:.....

Thank you very much for you assistance and co-operation.

## Appendix 2: Question guide for in-depth interview with key informants (local leaders, traditional birth attendants and lactating mothers)

I am a student of MPH Moi University. I would like to thank you for agreeing to participate in this study. The aim of the study is to determine community perspectives on infant feeding options for HIV infected mothers. Please feel free to ask questions during and after the interview. Thank you.

### Main information

1. When does breastfeeding start?
2. How long are infants breast-fed?
3. Are there other breast milk substitutes given to infants?
4. When do you start weaning?
5. Does breastfeeding continue during weaning?
6. What kinds of food do you introduce during weaning?
7. Who decides what is the best infant feeding method for your children? (Probe)
8. What do you think of a mother who does not breast-feed? (Probe)
9. What do people say about a mother who does not breast-feed? (Probe)
10. Are there cases when mothers are not allowed to breast-feed? (Probe)
11. What do you think of an infected mother? (Probe)
12. Do you think infants can get infected with the HI virus? (Probe)
13. Do you think that breastfeeding is a mode of mother to child transmission of HIV?
14. Are you aware of the recommended infant feeding options for HIV infected mothers?
15. Which of the following breast milk substitutes are you aware of and how are they prepared?
  - Animal milk
  - Infant formula
  - Exclusive breastfeeding for 6 months
  - Wet nursing
  - Milk banks
16. (a) If you were infected with HIV, which method would you prefer be used and why?  
(b) What is the reason for not using the other methods?
17. Which infant feeding method would be most accessible in this area?
18. What is the cost of cow's milk?
19. What is the cost of formula milk?
20. What obstacles are HIV positive mothers most likely to face while using breast milk substitutes? (Probe)
21. What do you think should be done to support an HIV mother who has to use the infant feeding options? (Probe)