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Original Article

Mother's perceptions and experiences of infant feeding within a community-based peer counselling intervention in South Africa

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Abstract

Exclusive breastfeeding (EBF) has the potential to significantly reduce infant mortality, but is frequently not practiced in low-income settings where infants are vulnerable to malnutrition and infections including human immunodeficiency virus (HIV). This study explores mothers' experiences of infant feeding after receiving peer counselling promoting exclusive breast or formula feeding. This qualitative study was embedded in a cluster randomized peer counselling intervention trial in South Africa that aimed to evaluate the effect of peer counselling on EBF. Participants were selected from the three districts that were part of the trial reflecting different socio-economic conditions, rural–urban locations and HIV prevalence rates. Seventeen HIV-positive and -negative mothers allocated to intervention clusters were recruited. Despite perceived health and economic benefits of breastfeeding, several barriers to EBF remained, which contributed to a preference for mixed feeding. The understanding of the promotional message of 'exclusive' feeding was limited to 'not mixing two milks': breast or formula and did not address early introduction of foods and other liquids. Further, a crying infant or an infant who did not sleep at night were given as strong reasons for introducing semi-solid foods as early as 1 month. In addition, the need to adhere to the cultural practice of 'cleansing' and the knowledge that this practice is not compatible with EBF appeared to promote the decision to formula feed in HIV-positive mothers. Efforts to reduce barriers to EBF need to be intensified and further take into account the strong cultural beliefs that promote mixed feeding.

Keywords: HIV, exclusive breastfeeding, formula feeding, peer counselling, South Africa.

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Introduction

The protective effects of breastfeeding in reducing infant morbidity and mortality because of malnutrition, repeated diarrhoeal infections and pneumonia are well recognized (Bahl *et al.* 2005). Apart from these significant advantages, exclusive breastfeeding (EBF) has been further associated with more than 40% decreased risk of human immunodeficiency virus (HIV) transmission compared with mixed feeding (breast milk in addition to other liquids or foods) (Iliff *et al.* 2005; Coovadia *et al.* 2007). However, despite the beneficial effects of breastfeeding, the practice of EBF during the first 6 months of life remains low in most countries, especially in low-income settings where infants are more vulnerable to malnutrition and childhood infections (Shirima *et al.* 2001; Bland *et al.* 2002; Engebretsen *et al.* 2007).

EBF rates in the first 6 months of infants' life are found to be generally lower in Africa compared with Asia and Latin America, with great differences between and within countries (Black *et al.* 2008). A secondary data analysis of Demographic and Health Survey of 2482 children in Bangladesh shows a 42.5% prevalence of EBF under 6 months (Mihrshahi *et al.* 2010). In Uganda, a dietary recall since birth have shown an EBF rate of only 7% by 3 months in spite of a strong breastfeeding culture (Engebretsen *et al.* 2007). Similar trend has been documented in South Africa, where in 2009 a United Nations Children's Fund (UNICEF) report on the state of world's children found an EBF rate under 6 months of only 7% despite the fact that breastfeeding is the traditional feeding mode with majority (88%) of mothers initiating breastfeeding soon after birth (UNICEF 2009).

There are multiple reasons why mothers prematurely supplement breast milk with semi-solid foods and liquids in the first few months (Haider & Begum 1995; de Paoli *et al.* 2001; Thairu *et al.* 2005; Kristiansen *et al.* 2010). One of the most common reasons frequently cited by mothers in many communities throughout the world is the perception of breast milk insufficiency (Dykes & Williams 1999; McCann & Bender 2006; Sacco *et al.* 2006). The phenomenon of breast milk insufficiency has been associated with inadequate breastfeeding knowledge and technique by mothers, lack of maternal confidence in her breastfeeding ability promoted by infant crying behaviour or increased marketing and availability of commercial infant formula (Segura-Millán *et al.* 1994; Sacco *et al.* 2006; Salud *et al.* 2009; Doherty *et al.* 2011). While the effects of commercial infant formula on EBF rates is essentially difficult to prove, it is reasonable to believe that increased availability and the promotion of formula milk may reduce mothers' confidence in their ability to successfully exclusively breastfeed.

Two strategies have been reported to increase the rate of EBF: the baby-friendly hospital initiative and the use of lay health workers such as home-based peer counsellors (Morrow *et al.* 1999; Haider *et al.* 2000; Bhandari *et al.* 2003). The latter is emphasized as an important strategy for sustaining EBF beyond the first weeks after birth (Morrow *et al.* 1999; Haider *et al.* 2000; Bhandari *et al.* 2003; Agrasada *et al.* 2005) partly as it is expected to address prevailing norms. This study aimed to explore mothers' perceptions and experiences of infant feeding within a community-based peer counselling intervention promoting exclusive breast or formula feeding. Of particular interest was whether peer counselling on infant feeding helped the mothers to negotiate existing systems of beliefs and traditions. Such information is particularly important in a time when global infant feeding recommendations for HIV-positive mothers have

Key messages

- Despite peer counselling on infant feeding, important barriers remain for exclusive breastfeeding.
- HIV-positive mothers are exposed to several risks of infant feeding associated with stigma, threatening their ability to choose and maintain exclusive infant feeding.
- Identified feeding barriers are culturally embedded and further efforts to improve exclusive breastfeeding need to engage not only mothers and the health system but also the broader community.

recently been revised in support of EBF with antiretroviral treatment for mothers or antiretroviral prophylaxis for breastfeeding infants, which should enable large-scale promotion of EBF regardless of maternal HIV status.

Methods

Design and study site

This exploratory qualitative study was embedded in a multi-country community-based randomized trial known as 'Promoting Infant Health and Nutrition in Sub-Saharan Africa: Safety and Efficacy of Exclusive Breastfeeding Promotion in the Era of HIV' (PROMISE-EBF, further details at http://www.clinicaltrials.gov no: NCT00397150). The trial aimed to determine the effect of peer counselling on rates of EBF in four African countries including South Africa, Uganda, Burkina Faso and Zambia. In contrast to the other countries, South Africa supported both exclusive breastfeeding and formula feeding. HIV-positive mothers who chose not to breastfeed their infants were provided with free formula milk for a period of 6 months from the health clinics as part of the current South African prevention of mother-to-child transmission policy. In total, 34 peer counsellors received a modified training package adapted from the World Health Organization (WHO)/UNICEF 'HIV and Infant Feeding Counselling: A Training Course' (WHO *et al.* 2000) and WHO/UNICEF 'Breastfeeding Counselling Course' (WHO & UNICEF 1993). Detailed description of the process of training and recruitment of peer counsellors has been described elsewhere (Nor *et al.* 2009). The training was composed of 40 hours in class and 1 week of observation and supervision in the hospital post-natal ward. The content of the course included overview of the health and economic benefits of EBF, breastfeeding management, dangers of mixed feeding, safe preparation and storage of formula milk, management of common infant illnesses, counselling techniques and information about how to facilitate and support HIV disclosure. The peer counsellors were expected to make five home visits per woman, one antenatal and four post-natal.

Counselling for infant feeding choice was done by health clinic staffs who were knowledgeable of women's HIV status. The role of peer counsellors as 'peers' was to help mothers adhere to their chosen feeding mode of either exclusive breast or formula feeding. The peer counsellors were expected to do this by recognizing and addressing the existing socio-cultural barriers to exclusive infant feeding. To protect the mothers' confidentiality, the peer counsellors were not informed about their HIV status unless the mother herself had provided this information.

The South African PROMISE-EBF trial was implemented in three districts (Rietvlei, Paarl and Umlazi) in order to reflect different socio-economic conditions, rural–urban locations and HIV prevalence rates. Rietvlei is situated in the Kwa-Zulu Natal province and is one of the poorest rural districts of South Africa with an antenatal HIV prevalence of 28% and an infant mortality rate (IMR) of 99/1000 live births. Paarl is a well-resourced peri-urban township in the Western Cape, which is situated in an area of commercial farming. The HIV prevalence among pregnant mothers attending antenatal care services is 9% and the IMR is estimated to be around 40/1000 live births. Umlazi is a large peri-urban township on the outskirts of Durban, in the province of KwaZulu Natal. The area is composed of formal and informal housing. The province has the highest rate of HIV infection in South Africa, with a prevalence of 44% among antenatal clients. The IMR is estimated to be around 60/1000 live births (National Department of Health 2007).

Preliminary results of the South African site of the PROMISE-EBF trial shows that the peer counselling intervention had a small but significant impact and resulted in a twofold increase in the practice of EBF in the intervention clusters compared with control clusters. Detailed information about the PROMISE-EBF trial are presented elsewhere (Jackson 2009; Tylleskär 2009).

Study population and sampling

Our sub-study was conducted from July to August 2006 after receiving ethical approval from the Ethics Committee of University of Western Cape in South Africa and Regional Ethical Board, Uppsala, Sweden. A total

of 17 mothers from the three geographical areas of different ages, parity and HIV status who were participating in the PROMISE-EBF peer counselling intervention clusters were purposively recruited at 12–16 weeks post partum. Mothers who were eligible according to the aforementioned criteria were identified and informed about the study through the PROMISE-EBF research coordinators in the three districts before written informed consent was requested.

Data collection

Semi-structured interviews were conducted with the 17 mothers at their homes by the fourth author (YZ), who is fluent in the languages spoken in the areas. We used an inductive emergent design as a study approach. Data analysis was undertaken concurrently with data collection, where emerging issues were included in subsequent interviews and final sample size was determined based on the emerging data (Dahlgren *et al.* 2004). The first author (BN) trained and supervised the interviewer. A semi-structured interview guide was used. The main interview question was 'what can you tell me about the way in which you have fed your child since birth?' (for definitions of infant feeding terminology and acronyms, see Table 1).

Data analysis

The tape recorded interviews were transcribed verbatim to their original language by the fourth author (YZ) before being translated into English. To ensure that the content and the core meaning of the original text were preserved during translation, an independent researcher cross-checked the original transcripts against the translated ones. No major discrepancies were identified. The method of analysis was qualitative interpretative description (Thorne *et al.* 1997) in conjunction with the social constructivist conceptual framework, articulated by, among others, Guba & Lincoln (1989). The inductive analytical approach in these methods provided a comprehensive and contextualized understanding of the experiences described by mothers.

The first and fourth author (BN and YZ) read and analysed the total data set independently of each other using content analysis to sort and to categorize data (Graneheim & Lundman 2004). The subsequent analysis involved joint reading of the transcripts to perform coding and labelling, reflect on the key elements of the data, find new relationships, clarify the emerging ideas and identify patterns. Further systematic reading of the codes and discussions about the developed categories and themes were held throughout the process of analysis by authors two (BMA) and six (EC-E). The developed themes and findings were written up and shared with the broader research team for further validation. Through this process, themes presented in this paper were developed.

Table 1. Definitions* of infant feeding practices

Feeding practice	Definition
Exclusive breastfeeding (EBF)	Breast milk alone, not even water, except for ORS, syrups, vitamins and medicines
Mixed feeding†	Breast milk in addition to other liquids or semi-solid foods
Formula feeding (EFF)‡	Formula milk in addition to other liquids and semi-solid foods. No breast milk given.

ORS, oral rehydration solution. *World Health Organization (2007). †This concept is not included in the World Health Organization statement but is commonly used in research on breastfeeding and human immunodeficiency virus (HIV) transmission risk. ‡In some high-HIV settings exclusive formula feeding is provided for mothers choosing not to breastfeed.

Results

The mean age of the 17 mothers included in our study was 24 years (range 16–37 years), seven were HIV-positive and nine were HIV-negative and one had unknown HIV status. The following section presents the two main themes developed through the process of data analysis: factors promoting the practice of breastfeeding and factors promoting mixed feeding in the South African context.

Factors promoting breastfeeding

Breastfeeding and the perception of a 'healthy baby'

The mothers' perception of a breastfed baby as a 'healthy baby' was supported by their positive

experiences and observations of absence of infant illness and perceived weight gain in breastfed infants. These, along with observations of negative discourse related to formula feeding in the community, are some of the key issues promoting the choice to breastfeed.

He has never been sick. I think it is the breast milk. It keeps him from getting sick. People often say that if you give the bottle [formula milk] to your baby it makes him sick. I love breastfeeding my baby. I really enjoy it. (19 years old, HIV-positive mother, Umlazi)

Another mother expressed:

I thought it was a good idea [to breastfeed] as I have breastfed my other children and I have seen how healthy they are. The first born weighed 4.3 kg at birth, but by the time he was 2 months old he was weighing 5 kg. I attributed that to the breast milk because he was not formula feeding (30 years old, HIV-negative mother, Umlazi)

The prohibitive costs of formula milk

While formula milk should be offered to HIV-positive mothers, only if acceptable, feasible, affordable, sustainable, and safe, our data suggests that this was not always the case. HIV-positive mothers who had chosen to formula feed could not always obtain supplies of formula milk from the health clinics. As such, the mothers' breastfed their infants for a short period of time and then later changed to formula milk when it was available.

I tested HIV positive when I was 8 months pregnant. The doctors said I should not breastfeed him. I should get formula milk at the clinic. They said people who are HIV positive get the tins [formula milk]. So I went to get the milk but I did not find it. I went again when he was 3 months old. He breastfed for 2 months [. . .] I then gave him the bottle [formula milk]. (21 years old, HIV-positive mother, Rietvlei)

The unavailability of the free formula milk for HIV-positive mothers was problematic in a number of ways. First, as indicated earlier, it forced mothers to mixed-feed. Second, it appears to put additional financial burden on mothers, especially those with limited resources.

It would have been better if the baby had started with breastfeeding so that [. . .] only [when the baby is 3 months old] I would start buying food with the money. [. . .] every bit of money I get I have to go and buy a tin of formula (23 years old, HIV-positive mother, Rietvlei)

The financial burden attached to the use of formula milk was said to be a reason for not selecting formula milk as the primary feeding mode as indicated by the following quote of an HIV-positive mother.

I love breastfeeding my baby. I really enjoy it because I do not suffer [financially] from having to buy tins [formula milk]. Even when there is no money I just breastfeed him and I have no problem. (19 years old, HIV-positive mother, Umlazi)

HIV-negative mothers who are not eligible for free formula milk from the health clinics reported similar experiences. Formula feeding was considered an option, but because of the prohibitive costs of formula milk, it was not practised.

I said to myself, because I do not have the power to buy formula milk and I am at home I should breastfeed him. (18 years old, HIV-negative mother, Umlazi)

The HIV-negative mothers who chose to formula feed their newborn infants experienced challenges during the course of feeding, especially as some of those mothers were economically dependent on their families.

What I have found to be difficult is that the milk [formula milk] finishes before the end of the month and I am forced to trouble my mother so that she buys me the milk. (16 years old, HIV-negative mother, Rietvlei)

Factors promoting mixed feeding

Despite the factors supporting the initiation of breastfeeding, there appears to be other factors that promote early introduction of semi-solid foods and other liquids. This includes the concern that breast milk alone is not 'enough', the perceived need and the cultural practice of giving water and traditional medicines in early infancy, mothers' limited understanding of the promotional messages and concept of 'exclusive' feeding and fear of HIV

stigmatization associated with the practice of exclusive feeding.

The concern with the adequacy of breast milk

Porridge and formula milk were frequently given to infants as early as 1 month of age because of the concern that breast milk alone is not 'enough' for the nutritional needs of the infant.

I give her porridge and the bottle [infant formula]. She is also breastfeeding. [. . .] I started giving her porridge when she was 1 month old because she was not getting enough from my breasts. Sometimes nothing would come out. (16 years old, HIV-negative mother, Paarl)

Interestingly, however, the perception of insufficiency was not limited to breast milk alone but was also associated with formula feeding as expressed by an HIV-positive mother who chose formula milk as her option. A crying infant or an infant who did not sleep at night were strong indications that breast or formula milk alone was not sufficient.

I thought I would give him formula [. . .] as they advised at the clinic, but I could not do it. He gets hungry, so I give him other foods. If I don't give him [porridge] he cries. I bought him [food] and fed him then he started sleeping. The formula milk on its own does not satisfy him. (33 years old, HIV-positive mother, Umlazi)

Another mother expressed, 'I saw that he becomes hungry. I saw him crying even when he was breastfeeding a lot. You could see that something was lacking. So I decided that its better that I give him food and so we sleep now. When he is not fed porridge we do not get any sleep' (18 years old, HIV-negative mother, Umlazi)

Further, an infant with perceived slow weight gain during breastfeeding was perceived to be an indication that breast milk alone is not 'sufficient' as the following quote suggests:

He was on the breast the first week but because my nipples were flat and he didn't get enough, he lost weight so I gave him the bottle [formula milk]. He drinks five bottles a day as suggested on the tin [container]. I give him gripe water occasionally especially when he gets constipated. (17 years old, HIV-negative mother, Paarl)

To the question whether mothers had received information about the appropriate time to introduce semi-solid foods and liquids, it appears clear that mothers had been informed by health staff at the clinic.

The nurses said that I must not hurry the baby because her intestines are too small to receive foods. She must grow a bit. They said foods should be given at 6 months, but she gets hungry and cries. (27 years old, HIV-positive mother, Umlazi)

Similarly, peer counsellors were trained to discourage mixed-feeding practice among mothers.

Well, she [peer counsellor] said if I feed her [infant] porridge she is going to become constipated. She is still too young. She said I must just breastfeed her and she will be full from that and then give her infant porridge when she is four months old. (16 years old, HIV-negative mother, Paarl)

However, some mothers voiced strong opinions against the information given by health staff at the clinic. This was possibly because the information given did not reflect the cultural context in which mothers make their feeding decisions.

I had been told at the clinic to give one kind of milk only. Giving the baby two kinds is not allowed [. . .] but I thought no I am not going to listen to this nonsense from the clinic. I gave him food when he was still just 1 month old, I gave him porridge and I saw that he eats it. Then I decided to give him porridge frequently and not be hesitant. (18 years old, HIV-negative mother, Umlazi)

The perceived need for water and traditional medicines

In the study areas, water and traditional medicines were reportedly used for 'cleansing' purposes. This practice was, however, not supported by the nurses at the health clinics. The mothers described the nurses as having 'their own rules'. As a result, the nurses' advice was silently rejected when it conflicted with the mothers' personal perspectives about what is appropriate in their context.

I usually give him water, water cleans his stomach. But the clinic does not want us to give water. They say there is no such thing that the baby gets cleaned. You see, they have their own rules, we laugh at the clinic. Yes we do. They also don't want us to use pacifiers, but we let the baby suck it

and when we go to the clinic, we hide it. (18 years old, HIV-negative mother, Umlazi)

Because of the strong social pressure to give traditional Zulu medicines, mothers selected formula milk as an alternative feeding option. It appears as if mothers interpreted that Zulu medicines can not be given if they chose to exclusively breastfeed but that it could be given if they decided to formula feed. The following quote was expressed by an HIV-positive mother, who had selected formula milk because she worried about the families' opinion.

At the clinic, I was told to breastfeed for three months. I was also told to not give him our traditional medicines as well as water. The baby is to breastfeed only. I then realized that no, because when they at home say buy the baby traditional Zulu medicines, how would I refuse? So I decided, I do not breastfeed at all, so that she could be able to drink the Zulu medicines. (23 years old, HIV-positive mother, Rietvlei)

Mothers' limited understanding of exclusive infant feeding

The promotional messages of 'exclusive' breast and formula feeding appeared to be understood by mothers as 'not mixing two milks', i.e. specifically breast with formula milk. The mothers' idea of exclusive feeding did not exclude the mixing of other foods and liquids. This potential misunderstanding of 'two milks' is illustrated by an HIV-negative mother's interpretation of the advice she was given at the health clinic:

[. . .] a counsellor was talking at the clinic saying [. . .] we must breastfeed the baby, we must not give the baby two [milk] things, the baby must drink only one thing. (18 years old, HIV-negative mother, Umlazi).

The word 'only' was repeatedly used by a number of mothers when describing 'exclusive' infant feeding practice. However, the mothers' descriptions of 'only' reflected what they did on a single occasion and did not reflect their feeding practice over time. The possible confusion of what is meant by 'exclusive' feeding was expressed by an HIV-positive mother who, in addition to breast milk, also gave porridge after failing to introduce formula milk.

I am only breastfeeding her. She does not like the tin [infant formula] [. . .] I started giving her the tin when she was 1 month old [. . .] even when I mixed it with infant porridge, she just would not eat it. (19 years old, HIV-positive mother, Rietvlei)

Stigma of not breastfeeding

Exclusive formula feeding was not socially acceptable in the study areas as it exposed mothers to potential risks of being stigmatized as HIV-positive. This is implied from the following quote of fear of social stigma associated with not breastfeeding.

She [counsellor] tells you about the formula milk that you get from the clinic. She explained that actually this milk [formula] is given to people who have a problem, so I know that it is also going to be said that I am sick, that I do not want my baby to breastfeed because I am sick. [. . .] There is this girl who took this milk but now she is not taking it anymore. She became ashamed that people are actually laughing at her because she is taking the milk that is for free. (18 years old, HIV-negative mother, Umlazi)

The aforementioned quote further indicates a stigma towards collecting the free formula milk from the health clinics.

Discussion

This study was conceptualized in the context of a peer counselling infant feeding intervention in South Africa aiming to increase the rate of EBF and for HIV-positive women, exclusive formula feeding. Despite home-based peer counselling on infant feeding and the mothers' perceptions of health and economic benefits of breastfeeding, important barriers to EBF remained. We found evidence that the promotional messages of EBF used by peer counsellors and at health centres may be misunderstood by the mothers. Further, premature introduction of semi-solids appears to be strongly supported by the perception of inadequacy of breast milk as judged by a crying infant who does not sleep through the night. In addition, the wish to adhere to traditional practices involving providing water and traditional medicines made mothers deviate from EBF and may even

support decisions to formula feed. Finally, we confirm that stigma associated with not breastfeeding and with the use of free formula are barriers to exclusive formula feeding in HIV-positive mothers.

Our finding about the phenomenon of breast milk insufficiency is consistent with previous research that has been conducted across diverse cultural norms and practices, socio-economic status of mothers and rural and urban contexts (McCann & Bender 2006; Sacco *et al.* 2006). Porridge and formula milk were given to infants as early as 1 month of age because of concerns about hunger as judged by infant crying and in particular, not sleeping through the night. While breast milk insufficiency frequently has been linked with crying behaviour of the infant, we have not found reports that make a strong connection with crying specifically at night time and consequently lack of sleep. The concern of lack of sleep was an important incentive and justification for mixed feeding in early infancy. It is critical to understand the underlying mechanisms for mothers' interpretation that breast milk is insufficient and subsequent perceived need to early complementary food. Our study shows evidence that lack of nighttime sleep of infant (and mother) is a cue for mothers' perceptions that breast milk alone is not sufficient thus providing opportunities for refinement in future messages promoting EBF.

The message and concept of 'exclusive' feeding, while it was given to the mothers, may be misinterpreted as meaning 'not mixing two milks': breast and formula milk. The mothers appeared not to recognize the feeding of semi-solid foods and other liquids, while still on breast or formula, as mixed feeding. This finding is important in that it highlights that the messages received from clinics and peer counsellors were not well understood. The possible confusion of what is meant by 'exclusive' feeding needs to be clarified for health workers and community infant feeding promotion programmes.

Our finding that formula milk alone was also considered 'insufficient' by mothers is something that has not been well described previously. Although EBF is frequently perceived to be inadequate (Engebretsen *et al.* 2007; Fjeld *et al.* 2008), the perception from mothers that formula milk alone is also inadequate for a young infant is a new concept. However, it is possible that this may be because of over-dilution of formula milk as a result of periodically unavailability of free formula milk at the health clinics rather than perceived insufficiency to satisfy the nutritional needs of the newborn. The need to use water and traditional medicines for 'cleansing' purposes further justified a mixed-feeding practice. What is new and interesting in our study is the knowledge that mothers need to comply with the cultural practice and belief of 'cleansing' and their knowledge that this practice is not compatible with EBF appeared to promote the use of formula milk for HIV-positive mothers.

The new WHO HIV and infant feeding policy guidelines (WHO *et al.* 2009), specifically the recommendation to promote EBF combined with maternal or infant antiretroviral therapy for HIV-positive mothers, are important, particularly in the South African context where the provision of free formula milk through the public health system have been documented to be challenging for achieving the goal of child survival (Doherty *et al.* 2011). If the WHO policy was implemented, it could address important factors currently promoting mixed feeding among HIV-positive mothers, in particular the social stigma associated with free commercial formula milk (Doherty *et al.* 2006) and the stigma of not breastfeeding. The implementation of a feeding policy focusing on EBF for all mothers may also be more effective in promoting EBF as a norm in the society and thus also be beneficial for HIV-negative mothers. However, implementation of the policy would most likely not address the perception of 'insufficiency' of breast milk and thus the perceived need to give porridge, water and traditional medicines in early infancy. Challenges remain therefore in how to efficiently address prevailing socio-cultural norms and practices of infant feeding in this context.

Buskens and colleagues (Buskens *et al.* 2007, p. 1107), in their ethnographic study of infant feeding practices of mothers in Southern Africa challenge the inherent assumptions in frequently used public health intervention models including the PROMISE-EBF intervention, where there is an expectation that one-to-one information will lead to

changes in behaviour at the individual level. The authors conclude by asking if current efforts to promote infant feeding are not 'asking mothers to challenge both their own and traditional systems of beliefs and influence, including challenging those in authority over them'. In our data, it was evident that the mothers experienced a conflict between existing feeding norms and feeding recommendations provided by both health staff and peer counsellors. An important question is, therefore, how should public health programmes in the face of the Millennium Development Goals overcome the socio-cultural barriers to EBF? It seems that one-on-one infant feeding support will not give the expected results of EBF, unless there are also efforts to engage both health systems and the broader community.

Our qualitative study shows that despite provision of infant feeding support to mothers, important socio-cultural barriers remained towards adherence to exclusive breast and formula feeding that the peer counsellors in this trial were unable to overcome. While it does not make an attempt to generalize, it aims to sensitize readers including policy-makers on the need to rethink current approaches to EBF promotion and support. Implementation of the new WHO HIV and infant feeding guideline could minimize the risk of stigma and may be more effective in increasing EBF practises in HIV-negative women. Mothers negotiate their feeding choice and behaviour within a specific socio-cultural context with real pressures and advice from family and the formal health system. These sources of pressure and information need to be better aligned and taken into account in the planning and implementation of breastfeeding support programmes.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Contribution

BN participated in the design of the study, developed data collection tools, supervised data collection, performed data analysis and drafted the first manuscript. YZ participated in the data collection, data analysis and revised and approved the final manuscript. TD and DJ participated in the design of the study and approved the final manuscript. B-MA and E-CE participated in the design of the study, interpretation of data, revised and approved the final manuscript.

References

Agrasada G.V., Gustafsson J., Kylberg E. & Ewald U. (2005) Postnatal peer counselling on exclusive breastfeeding of low-birthweight infants: a randomized, controlled trial. *Acta Paediatrica* **94**, 1109–1115.

Bahl R., Frost C. *et al.* (2005) Infant feeding patterns and risks of death and hospitalization in the first half of infancy: multicentre cohort study. *Bulletin of the World Health Organization* **83**, 418–426.

Bhandari N., Bahl R. *et al.* (2003) Effect of community-based promotion of exclusive breastfeeding on diarrhoeal illness and growth: a cluster randomised controlled trial. *Lancet* **361**, 1418–1423.

Black R., Allen L. *et al.* (2008) Maternal and child undernutrition: global and regional exposures and health consequences. *Lancet* **371**, 243–260.

Bland R., Rollins N., Coutsoudis A. & Coovadia H. for the Child Health Group (2002) Breastfeeding practices in an area of high HIV prevalence in rural South Africa. *Acta Paediatrica* **91**, 704–711.

Buskens I., Jaffe A. & Mkhatshwa H. (2007) Infant feeding practices: realities and mind sets of mothers in southern Africa. *AIDS Care* **19**, 1101–1109.

Coovadia H.M., Rollins N.C. *et al.* (2007) Mother-to-child transmission of HIV-1 infection during exclusive breastfeeding in the first 6 months of life: an intervention cohort study. *Lancet* **369**, 1107–1116.

Dahlgren L., Emmelin M. & Winkvist A. (2004) *Qualitative Methodology for International Public Health*. Umeå University: Umeå.

Doherty T., Chopra M., Nkonki L., Jackson D. & Greiner T. (2006) Effect of the HIV epidemic on infant feeding in South Africa: 'when they see me coming with the tins they laugh at me'. *Bulletin of the World Health Organization* **84**, 90–96.

Doherty T., Sanders D., Goga A. & Jackson D. (2011) Implications of the new WHO guidelines on HIV and infant feeding for child survival in South Africa. *Bulletin of the World Health Organization* **89**, 62–67.

Dykes F. & Williams C. (1999) Falling by the wayside: a phenomenological exploration of perceived breast-milk inadequacy in lactating women. *Midwifery* **15**, 232–246.

Engebretsen I.M., Wamani H., Karamagi C, Semiyaga N., Tumwine J. & Tylleskär T. (2007) Low adherence to exclusive breastfeeding in Eastern Uganda: a community-based cross-sectional study comparing dietary recall since birth with 24-hour recall. *BMC Pediatrics* **7**, 10.

Fjeld E., Siziya S. *et al.* (2008) 'No sister, the breast alone is not enough for my baby' a qualitative assessment of potentials and barriers in the promotion of exclusive breastfeeding in southern Zambia. *International Breastfeeding Journal* **3**, 26.

Graneheim U.H. & Lundman B. (2004) Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today* **24**, 105–112.

Guba E.G. & Lincoln Y.S. (1989) *Fourth Generation Evaluation*. Sage Publications: Newbury Park, CA.

Haider R. & Begum S. (1995) Working women, maternity entitlements, and breastfeeding: a report from Bangladesh. *Journal of Human Lactation* **11**, 273–277.

Haider R., Ashworth A., Kabir I. & Huttly S.R.A. (2000) Effect of community-based peer counsellors on exclusive breastfeeding practices in Dhaka, Bangladesh: a randomised controlled trial. *Lancet* **356**, 1643–1647.

Iliff P.J., Piwoz E.G. *et al.* (2005) Early exclusive breastfeeding reduces the risk of postnatal HIV-1 transmission and increases HIV-free survival. *AIDS* **19**, 699–708.

Jackson D. (2009) Preliminary results from the multicentre cluster-randomised behaviour intervention trial PROMISE EBF: exclusive breastfeeding promotion in Sub-Saharan Africa. Presentation at the American Public Health Association, 7–11 Nov 2009, Philadelphia.

Kristiansen A.L., Lande B., Øverby N.C. & Andersen L.F. (2010) Factors associated with exclusive breast-feeding and breast-feeding in Norway. *Public Health Nutrition* **13**, 2087–2096.

McCann M. & Bender D. (2006) Perceived insufficient milk as a barrier to optimal infant feeding: examples from Bolivia. *Journal of Biosocial Science* **38**, 341–364.

Mihrshahi S., Kabir I. *et al.* (2010) Determinants of infant and young child feeding practices in Bangladesh: secondary data analysis of Demographic and Health Survey 2004. *Food Nutr Bull* **31**, 295–313.

Morrow A.L., Guerrero M.L. *et al.* (1999) Efficacy of home-based peer counselling to promote exclusive breastfeeding: a randomised controlled trial. *Lancet* **353**, 1226–1231.

National Department of Health (2007) *National HIV and Syphilis Prevalence Survey, South Africa*. Department of Health: Pretoria.

Nor B., Zembe Y. *et al.* (2009) 'Peer but not peer': considering the context of infant feeding peer counseling in a high HIV prevalence area. *Journal of Human Lactation* **25**, 427–434.

de Paoli M., Manongi R., Helsing E. & Klepp K.I. (2001) Exclusive breastfeeding in the era of AIDS. *Journal of Human Lactation* **17**, 313–320.

Sacco L.M., Caulfield L.E., Gittelsohn J. & Martínez H. (2006) The conceptualization of perceived insufficient milk among Mexican mothers. *Journal of Human Lactation* **22**, 277–286.

Salud M.A.L.B., Gallardo J.I. *et al.* (2009) People's initiative to counteract misinformation and marketing practices: the Pembo, Philippines, breastfeeding experience, 2006. *Journal of Human Lactation* **25**, 341–349.

Segura-Millán S., Dewey K.G. & Perez-Escamilla R. (1994) Factors associated with perceived insufficient milk in a low-income urban population in Mexico. *Journal of Nutrition* **124**, 202–212.

Shirima R., Greiner T., Kylberg E. & Gebre-Medhin M. (2001) Exclusive breast-feeding is rarely practised in rural and urban Morogoro, Tanzania. *Public Health Nutrition* **4**, 147–154.

Thairu L.N., Pelto G.H., Rollins N.C., Bland R.M. & Ntshangase N. (2005) Sociocultural influences on infant feeding decisions among HIV-infected women in rural Kwa-Zulu Natal, South Africa. *Maternal and Child Nutrition* **1**, 2–10.

Thorne S., Kirkham S.R. & MacDonald-Emes J. (1997) Interpretive description: a noncategorical qualitative alternative for developing nursing knowledge. *Research in Nursing & Health* **20**, 169–177.

Tylleskär T. (2009) PROMISE-EBF: promotion of exclusive breastfeeding in Africa. Preliminary results from multi-centre cluster-randomised behaviour intervention trial. Presentation at International Congress of Nutrition, 4–9 Oct 2009, Bangkok.

United Nations Children's Fund (UNICEF) (2009) *The State of the Worlds Children*. United Nations Plaza: New York.

World Health Organization (WHO) (2007) Indicators for assessing infant and young child feeding practices:

conclusion of a consensus meeting held 6–8 Nov 2007 in Washington D.C., USA.

World Health Organization (WHO) & United Nations Children's Fund (UNICEF) (1993) *Breastfeeding Counselling: A Training Course. Trainers Guide*. WHO: Geneva.

World Health Organization (WHO), United Nations Children's Fund (UNICEF) *et al*. (2000) *HIV and Infant Feeding Counselling: A Training Course*. WHO: Geneva.

World Health Organization (WHO), United Nations Children's Fund (UNICEF) *et al*. (2009) *HIV and Infant Feeding. Revised Principles and Recommendations Rapid Advice*. WHO: Geneva.