

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/287566228>

WHO 2010 infant feeding guidelines in resource-limited settings: attitudes of human immunodeficiency virus-infected women and other role players in Kampala, Uganda

Article in *South African Journal of Clinical Nutrition* · January 2014

DOI: 10.1080/16070658.2014.11734489

CITATIONS

7

READS

89

10 authors, including:



Joyce Matovu

Makerere University - Johns Hopkins University Research Collaboration

31 PUBLICATIONS 130 CITATIONS

SEE PROFILE



Carolyne Onyango

Makerere University - Johns Hopkins University Research Collaboration

16 PUBLICATIONS 462 CITATIONS

SEE PROFILE



Mike Kagawa

Makerere University

21 PUBLICATIONS 237 CITATIONS

SEE PROFILE



Gorrette Nalwadda

Luziibangi Foundation and Makerere University

39 PUBLICATIONS 984 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



doctorate [View project](#)



Fusion [View project](#)

WHO 2010 infant feeding guidelines in resource-limited settings: attitudes of human immunodeficiency virus-infected women and other role players in Kampala, Uganda

Matovu JN, RM, Diploma in Guidance and Counselling, BCP, MA, Makerere University-Johns Hopkins Research Collaboration (MU-JHU)/Mulago Hospital PMTCT Program Coordinator/Investigator of Record; MU-JHU, Uganda

Onyango-Makumbi C, MBChB, MSEpi, Clinical Research Site Coordinator/Investigator, MU-JHU, Uganda

Namuli PE, RCN, Nurse Study Coordinator, MU-JHU, Uganda

Tanga EO, Diploma in Strategic Health Communication, BASWSA, MPH, Honorary Lecturer, Makerere School of Public Health, Uganda

Kagawa MN, MBChB, MMed, FellMedEd, Lecturer Department of Obstetrics and Gynaecology, College of Health Sciences, Makerere University, Uganda

Nalwadda GK, BScN, MSc PRH, PhD, Senior Lecturer and Researcher Department of Nursing, Makerere University College of Health Sciences, Uganda

Motevalli M, MS, BA, Research Associate, Johns Hopkins School of Medicine, Baltimore, USA

Semitala FC, MBChB, MMed, MPH, Lecturer, Department of Internal Medicine, Makerere University College of Health Sciences, Uganda

O'Gara ET, MSN, FNP, National Institute of Allergy and Infectious Diseases Medical Officer, Henry M Jackson Foundation, Division of AIDS, National Institute of Allergy and Infectious Diseases, National Institutes of Health, USA

Fowler MG, MD, MPH, Johns Hopkins Clinical Trials Unit Principal Investigator and Executive Director MU-JHU, Johns Hopkins University School of Medicine, Department of Pathology, Johns Hopkins Hospital, USA

Correspondence to: Joyce Matovu, e-mail: jmatovu@mujhu.org

Keywords: infant feeding, exclusive breastfeeding, HIV-infected lactating mothers, male partners, WHO, resource-limited settings

Abstract

Objective: The objective of the study was to describe the attitudes of human immunodeficiency virus (HIV)-infected women and other role players towards the World Health Organization (WHO) 2010 infant feeding guidelines.

Design: This was formative evaluation research, carried out from September–November 2011.

Setting: The study was conducted at Mulago Hospital, Kampala, Uganda.

Subjects: Focus group discussions (FGDs) were held among five groups: HIV-infected pregnant women (9), HIV-infected postpartum mothers (10), HIV-infected peers (10), male partners (10), family members of the pregnant women (10) and key informants (12).

Outcome measures: Descriptive data were collected through FGDs and key informant interviews.

Results: With the exception of male partners, the majority of FGD participants and key informants who were health workers held a positive attitude towards exclusive breastfeeding. The introduction of complementary foods at six months while HIV-infected lactating mother continued to breastfeed was supported by all of the health workers, but by only a minority of participants from each focus group discussion. The majority of FGD participants and the health workers were in favour of an HIV-infected lactating mother taking antiretroviral (ARV) drugs during the breastfeeding period, rather than the infant.

Conclusion: Three conclusions can be drawn from this study. Firstly, general attitudes towards the WHO 2010 infant feeding guidelines on exclusive breastfeeding were positive. Secondly, there were still fears about an HIV-infected mother introducing complementary foods at six months while continuing to breastfeed. Thirdly, all of the FGD participants and the majority of the health workers recommended that the mother should take ARV drugs in the lactating period.

© Peer reviewed. (Submitted: 2013-08-16. Accepted: 2013-11-23.) © SAJCN

S Afr J Clin Nutr 2014;27(2):63-68

Introduction

Breastfeeding, especially exclusive breastfeeding for the first six months of life, is critical for infant and under-five child survival in resource-limited settings. Given the importance of breastfeeding, World Health Organization (WHO) and country guidelines and policies have been put in place in the era of human immunodeficiency virus (HIV), that recommend ways of feeding infants born to HIV-infected women, in order to reduce the mother-to-child transmission (MTCT) of HIV. According to the WHO 2006 HIV and infant feeding guidelines,

HIV-infected women were encouraged to exclusively breastfeed for six months, and thereafter to replace breast milk with appropriate complementary feeds if they were able to meet the acceptable, feasible, affordable, sustainable and safe criteria.¹ In 2009/2010, the WHO issued new guidelines, recommending exclusive breastfeeding for the first six months of life. Thereafter, the guidelines suggest that complementary locally available foods should be introduced, and breastfeeding continued until the age of 12 months. Breastfeeding should only be stopped once a nutritionally adequate and safe diet without breast milk can be provided.^{2,3}

Table I: Characteristics of the focus group discussion participants, n = 49

Category of FGD	Inclusion criteria and role	No
HIV-infected pregnant women	Women in their third trimester, enrolled in the PMTCT programme, and considered to be potential users of the recommendations	9
HIV-infected postpartum mothers	Women enrolled in the PMTCT programme, and considered to be potential users of the recommendations	10
HIV-infected peers	Peers working in the PMTCT programme on a voluntary basis, with knowledge of the infant feeding guidelines	10 (♀:9, ♂:1)
Male partners	Male partners escorting their pregnant women to antenatal care, as they were likely to influence breastfeeding in the community	10
Family members	Close family members escorting pregnant women to antenatal care, as they were likely to influence breastfeeding in the community	10

FDG: focus group discussion, HIV: human immunodeficiency virus, PMTCT: prevention of mother-to-child transmission (of human immunodeficiency virus)

To ensure that mothers receive the care that they need, and to reduce the likelihood of MTCT of HIV, in 2012 the WHO revised the prevention of MTCT (PMTCT) guidelines on the use of antiretroviral (ARV) drugs to treat pregnant women and prevent HIV infection in infants, by recommending one of three options for HIV-infected women who breastfeed and who do not yet require antiretroviral therapy. The first option is that if a woman receives zidovudine during pregnancy, daily nevirapine is recommended for her infant from birth until the end of the breastfeeding period.⁴ The second option is that women who receive a three-drug regimen during pregnancy should continue taking the three-drug regimen until the end of breastfeeding period,⁴ and the third is that HIV-infected women identified during pregnancy should start triple ARV drugs, irrespective of CD4 count, and continue to do so for the rest of their lives.⁴

Despite the guidelines on HIV and infant feeding which were developed by the WHO in 2010, and adopted by the Uganda Ministry of Health, acceptability of these infant feeding guidelines in resource-limited settings has not been well documented. In Uganda, the majority of women (99%) initiate exclusive breastfeeding soon after birth.^{5,6} According to the 2011 Uganda Demographic Health Survey, overall exclusive breastfeeding rates by one month were 81.6%, by three months had reduced further to 67.1%, and by six months were below 40%.⁷ One study established that within three days of delivery, approximately 36% of HIV-infected women adhered to the infant feeding guidelines, while adherence to exclusive breastfeeding was 14% in those with infants aged five months and younger.⁸ Another study showed that exclusive breastfeeding rates were 66.7% in HIV-uninfected women, compared with 56.8% in women who were HIV-infected at three months.⁹ These studies show that adherence to the guidelines, particularly with regard to exclusive breastfeeding, decreases with the increasing age of the child. Many of the women, especially those who are HIV-infected, practise mixed feeding early, thus increasing their child's risk of HIV acquisition. Our study sought to understand and document the attitudes and perceptions held by HIV-infected women and other role players, including male partners, family members and health workers, on these guidelines. This should help to inform the Uganda Ministry of Health and other stakeholders with regard to the implementation of PMTCT.

Method

Study objective

The aim of this formative research was to explore and describe attitudes towards the WHO 2010 infant feeding guidelines by HIV-infected lactating mothers, held by HIV-infected women, the male partners of the pregnant women, family members of the pregnant women and health workers.

Study design

We conducted formative evaluation research using phenomenology approaches to describe the attitudes of participants, and explore understanding and identify themes to provide a structural explanation for exclusive breastfeeding through five focus group discussions (FGDs) and 12 key informant interviews as the first phase

of a larger intervention study promoting exclusive breastfeeding. The study was conducted from September–November 2011 in the Mulago National Referral Hospital, Kampala District, where a strong PMTCT programme has been in place since 2000. The purposive sample of participants represented a wide range of variation within the dimension of exclusive breastfeeding, and allowed an extensive array of perspectives to be captured, as well as triangulation of the data.

Study population

Focus group discussion participants

Participants aged 18 years and older, who were willing to participate in FGDs, were selected using a criterion sampling method. Participants provided informed consent, and were stratified into five FGDs, as detailed in Table I. Conducting the five FGDs enabled the research team to obtain perspectives from the different groups.

The characteristics of the the FGD participants are summarised in Table I.

HIV-infected women were included because the WHO 2010 infant feeding guidelines target them. Male partners and family members were included because they influence mothers with regard to breastfeeding.

The key informants

Criterion sampling was used to select 12 key informants, e.g. health workers who were selected and interviewed because of their knowledge and understanding of the guidelines, and for purposes of elaborating, confirming and deepening the initial analysis. These included health service providers at Mulago Hospital (10) and policy-makers at the Uganda Ministry of Health (2). Written informed consent was obtained from the key informants. The characteristics of the key informants are summarised in Table II.

Data collection and analysis

FGDs and key informant interviews were used to collect data. The tools were pre-tested using the local language (Luganda) for the FGD participants and English for the key informants. The FGDs lasted for

Table II: Characteristics of the key informants, n = 12

Category of key informant	Role	No
Ministry of Health PMTCT coordinator	PMTCT policy-maker	1
Ministry of Health infant feeding coordinator	Infant feeding policy-maker	1
Nurse	Health provider	1
Gynaecologist	Health provider	2
Pediatrician	Health provider	1
Counsellor	Counsel PMTCT clients	3
Midwife	Health provider	2
Nutritionist	Provide nutrition support	1

PMTCT: prevention of mother-to-child transmission (of human immunodeficiency virus)

1-2 hours and the key informant interviews 30-45 minutes, until the discussions yielded no new information. All of the interviews were audiotaped and transcribed verbatim. The notes and audiotapes from the FGDs were transcribed in Luganda and translated into English. A combination of descriptive, topical and analytical reflection was used to document and categorise the breadth of opinions stated by multiple participants. Descriptive coding was performed for the FGD participants using the attributes of gender and HIV status. Segments were coded in categories according to differences, similarities and in terms of assessing context. Data were then categorised using wording that participants used during the discussions, and the findings further synthesised by the definition of relationships between and among the concepts and groups. To reduce bias, two researchers independently coded the transcript recordings of the FGDs and key informant interviews. Using Excel® 2007, electronic transcripts were coded with predetermined descriptions. The general topics that participants discussed were grouped into categories and themes for further analysis.

Key emerging themes included:

- Awareness of the exclusive breastfeeding concept.
- Positive attitudes towards exclusive breastfeeding because of inherent benefits.
- Negative attitudes towards exclusive breastfeeding because of exposure of the child to HIV and deeply entrenched cultural taboos.
- Perceptions about HIV-infected lactating mothers introducing complementary foods at six months while continuing to breastfeed.
- Opinions on whether or not the HIV-infected mother or the baby should use ARV drugs during breastfeeding.

Validity and reliability

To cater for validity and reliability, a triangulation of methods for data collection and analysis was used. The reliability rigor included researchers holding discussions with the participants until no new information was yielded, bracketing by keeping an open context, and intuiting through examining the context of breastfeeding in the era of HIV. One FGD per group was used because information was obtained from heterogeneous FGD groups, including pregnant women, postpartum mothers, peers, male partners and family members. Two independent researchers were also used to code, compare, interpret

and analyse data. Reliability was further enhanced through the definition of relationships between and among concepts and groups.

Ethical considerations

The study proposal and consent forms were reviewed and approved by the relevant institutional review boards, the Joint Clinical Research Centre and Uganda National Council for Science and Technology in Uganda, as well as by Johns Hopkins Medicine in the USA.

Results

The results are presented in four sections, namely awareness of the exclusive breastfeeding concept; attitudes towards exclusive breastfeeding; perceptions of an HIV-infected lactating mother introducing complementary foods at six months while continuing to breastfeed; and opinions on who whether the mother or child should use ARV drugs during breastfeeding.

Awareness of the exclusive breastfeeding concept

The majority of FGD participants had an understanding of the exclusive breastfeeding concept. The highest awareness was in the HIV-infected postpartum mother FGD. However, the definition of exclusive breastfeeding tended to vary minimally within the different FGDs. Two participants described exclusive breastfeeding as follows: "What I understand by exclusive breastfeeding is a woman breastfeeding the baby without adding foods, not even juice, soda and/or milk from cows" (male partner FGD), and "not adding anything else, apart from prescribed medicine, from a doctor" (HIV-infected peer FGD).

Attitudes towards exclusive breastfeeding

Positive attitudes towards exclusive breastfeeding because of the inherent benefits

The majority of FGD participants and health workers held positive attitudes towards exclusive breastfeeding, and were in favour of HIV-infected lactating mothers practising exclusive breastfeeding for the first six months. Of the FGD participants, HIV-infected peers were mostly in favour, followed by family members.

The reasons for supporting exclusive breastfeeding, in order of importance were:

- The prevention of diseases and malnutrition, and the reduction of HIV acquisition in babies.
- Breast milk is high-quality nutrition and promotes infant growth.
- Facilitation of bonding between the mother and the baby.
- Breast milk is inexpensive and readily available.
- A reduction in stigma against HIV-infected, non-breastfeeding mothers in the community.

Health workers also expanded on reasons why an HIV-infected lactating mother should practise exclusive breastfeeding for the first six months.

The reasons in order of importance were that exclusive breastfeeding:

- Prevents disease.
- Promotes infant growth.
- Reduces the infant mortality rate.
- Is inexpensive.
- Can be used as a method of family planning.

Negative attitudes towards exclusive breastfeeding because of exposure of the child to human immunodeficiency virus

The male partners and most of the HIV-infected postpartum mother FGD participants did not support the concept of an HIV-infected lactating mother practising six months of exclusive breastfeeding. They were worried that if the child developed sores in the mouth and the mother had sores on her nipples during the breastfeeding period, this might expose the child to HIV infection: "I do not agree with this recommendation, because I am not sure that my child would not get an HIV infection. If it was not for poverty, I would not allow my child to breastfeed" (male partner FGD).

Negative attitudes towards exclusive breastfeeding because of deeply entrenched cultural taboos and other beliefs

In this study, some health workers were unenthusiastic about exclusive breastfeeding because of various cultural taboos and beliefs held by communities in Uganda, which lead to the early introduction of food: "In Ugandan culture, if a mother delivers, she is not supposed to give the baby breast milk as the first feed, and these cultures tend to hamper and really discourage exclusive breastfeeding. So if we can do away with these cultures, and if some myths that discourage exclusive breastfeeding are demystified, then it can be very helpful" (Ministry of Health infant feeding coordinator, key informant interview).

Other FGD participants worried that breastfeeding mothers didn't produce enough breast milk to satisfy the child: "I don't support exclusive breastfeeding because breast milk may reduce or dry up anytime. Therefore, one is free to stop and give the baby any other drink" (HIV-infected postpartum mother FGD).

Perceptions of human immunodeficiency virus-infected lactating mother introducing complementary foods at six months while continuing to breastfeed

In this study, the majority of health workers had the impression that an HIV-infected lactating mother should introduce complementary foods at six months while continuing to breastfeed. The reasons provided were that breast milk alone cannot satisfy a baby after six months, the baby would grow from the addition of the complementary food, and that breastfeeding would increase the love between the mother and baby. The few health workers who did not support the concept of an HIV-infected lactating mother introducing complementary food at six months while continuing to breastfeed were worried about the ever-changing and sometimes contradictory information provided on infant feeding, based on evolving guidelines. They reported that changing guidelines confused mothers, and interfered with implementation of the guidelines.

On the other hand, the majority of FGD participants, especially family members, HIV-infected pregnant and postpartum mothers, did not support the concept of mothers introducing complementary foods at six months while continuing breastfeed.

This was owing to fears that the baby would become exposed to HIV infection when:

- The baby grew teeth and bit the mother's nipple.
- The mother gave the baby hot food and the baby developed

mouth sores as a result, or if the mother fed the baby using a spoon which could rub against his or her gums or tongue, causing sores.

- The mother fed the baby using fingers with sores on them, while the infant also had sores in the mouth.
- The baby acquired sores in the mouth from salt added to the food: "I do not support the baby breastfeeding and eating other foods because health workers tell us that the baby gets sores in the mouth because of salt. If the baby starts eating food, one should not breastfeed" (family member FGD).

Opinions on whether or not the mother or child should use antiretroviral drugs during breastfeeding

In this study, the FGD participants and the majority of health workers endorsed mothers taking ARV drugs throughout the breastfeeding period, rather than the baby. The reasons given were that the mother would be better able to tolerate the ARV drug side-effects, as well as comply with and adhere to taking ARV drugs, than the baby. They also felt that, since the mother was infected, she could hide her illness by taking ARV drugs, and that this might reduce any associated stigma.

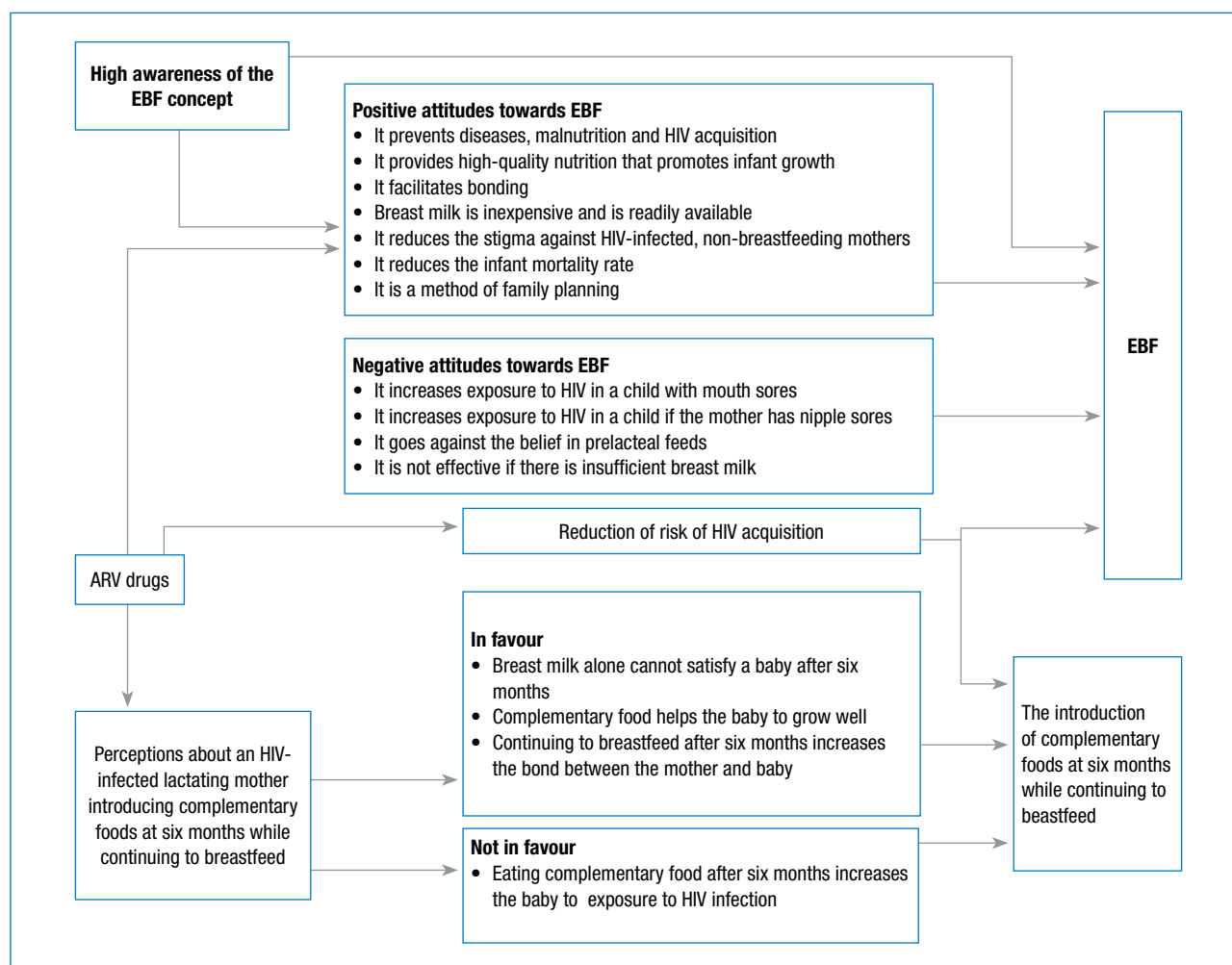
Figure 1 depicts the attitudes of human immunodeficiency virus-infected women and other role players towards the World Health Organization 2010 infant feeding guidelines.

Discussion

In this study, FGD participants exhibited a high awareness of exclusive breastfeeding. The majority of FGD participants, especially peers and family members, and the majority of health workers, supported the concept of exclusive breastfeeding for the first six months. In part, peer support for exclusive breastfeeding can be attributed to the fact that these people were working on the PMTCT programme on a voluntary basis, and had been trained on the infant feeding guidelines. Peer support for exclusive breastfeeding in this study was a positive sign that in the future, peers may be very helpful in supporting HIV-infected breastfeeding mothers to practise exclusive breastfeeding. It was also noted in this study that family members were very encouraging of exclusive breastfeeding. This is in contrast with a study that was carried out in South Africa¹⁰ where it was revealed that family members often placed pressure on mothers to introduce other foods, including liquid and semi-solid food, soon after birth.

A reduction in the associated stigma attached to HIV-infected women not breastfeeding was one of the reasons given for the acceptance of exclusive breastfeeding in these analyses. Other studies^{11,12} have reported similar findings. In a study carried out in rural KwaZulu-Natal, it was also found out that choosing to bottle feed was viewed as making an announcement that one was HIV-positive.¹³ Thus, practicing exclusive breastfeeding with ARV drug coverage would help to avoid the associated stigma attached to HIV-infected women not breastfeeding.

Awareness of and support given to exclusive breastfeeding in this study indicates that Ugandan communities understand the benefits of exclusive breastfeeding for the first six months of life, and that health workers are in position to implement the guidelines successfully.



ARV: antiretroviral, EBF: exclusive breastfeeding, HIV: human immunodeficiency virus

Figure 1: Conceptual framework explaining the attitudes of HIV-infected women and other role players towards WHO 2010 infant feeding guidelines

Despite the previously mentioned positive attitudes, negative attitudes were also held towards exclusive breastfeeding. These were expressed by the HIV-infected women's male partners and most of the HIV-infected postpartum mothers. The fear was that a baby could become infected during breastfeeding, particularly if he or she had sores in the mouth, and the mother had sores on her nipples. In this study, it was evident that FGD participants were concerned about HIV infection as a result of breastfeeding. This suggests a knowledge gap in the understanding of the role of ARV drugs in reducing the risk of transmission of HIV during breast feeding.

Fathers are key decision-makers with regard to infant feeding, and their support is crucial if successful breastfeeding is to occur. In one study, Tohotoa et al¹⁴ concluded that paternal, emotional, practical and physical support were important factors which help to promote successful breastfeeding. The fear of a baby becoming infected could negatively affect the HIV-infected mother's ability to practice exclusive breastfeeding for six months. Our study indicated that there is need to further educate and sensitise male partners and the community on the benefits of exclusive breastfeeding, and how ARV drugs protect against the risk of transmission of HIV during breastfeeding. The issue of insufficient breast milk was also viewed

as a likely barrier to six months of exclusive breastfeeding, in line with other studies that were carried out in other resource-limited settings, including Cameroon, Nigeria^{15,16} and Zambia.¹⁷

Some health workers, while positive in principle about exclusive breastfeeding, were of the view that exclusive breastfeeding was not easy to practise because of local cultural practices. In Tanzania, de Paoli et al¹⁸ reported that 46% of mothers, as well as relatives, gave other fluids, foods and herbs to their infants, in addition to breast milk, in the first six months. Most urban women in Cote d'Ivoire¹⁹ were unable to adhere to exclusive breastfeeding in the first six months because the early introduction of liquid from birth was common practice. Considering concerns expressed by participants in this study, as well as those in other studies, where exclusive breastfeeding adherence has been poor, the WHO 2010 recommendations on exclusive breastfeeding may be difficult to achieve without strong community sensitisation and social media messages to counter current fears, cultural beliefs and norms that favour the early introduction of other liquid and food. The findings in this study call for extensive health education talks within communities and counselling of male partners on the advantages of the WHO recommendations.

In this study, whereas the majority of health workers were in support of an HIV-infected lactating mother introducing complementary foods at six months while continuing to breastfeed, the majority of FGD participants were not. This concept may be challenging for HIV-infected mothers to accept as it seems to contradict prior WHO advice on early mixed feeding as a major risk of HIV transmission. Therefore, it would be important to target communities, family members and male partners when explaining the nutritional benefits of adding complementary food at six months of age, while using ARV drugs to provide continued protection against HIV transmission.

The WHO 2010 PMTCT options include both infant and maternal ARV prophylaxis to reduce the risk of transmission during lactation.³ The FGD participants and the majority of health workers felt that only the mothers should take ARV drugs. This is similar to attitudes expressed by HIV-infected breastfeeding women who participated in a clinical trial in Malawi, which included study arms with either infant or maternal ARV prophylaxis.²⁰ Maternal ARV prophylaxis was viewed to be more beneficial than infant ARV prophylaxis because it protects the infant, while maintaining the mother's health.

Based on the needs uncovered in this research, we recommend that strategies should be developed that focus on educating the public on a number of topics, including further education of male partners with regard to WHO infant feeding guidelines, by providing grassroots health education and counselling to men in the communities; and assessment of the support given by HIV-infected peers, family members and community health workers to mothers with respect to exclusive breastfeeding, and the introduction of complementary foods at six months with continued breastfeeding. Countrywide sensitisation is needed on the importance of ARV drugs throughout breastfeeding to reduce the risk of transmission of HIV, while promoting optimal infant growth and survival.

Conclusion

Three conclusions can be drawn, based on this study. Firstly, general attitudes towards the WHO 2010 infant feeding guidelines on exclusive breastfeeding were positive, except for those expressed by male partners. Secondly, there are still fears that an HIV-infected lactating mother who introduces complementary foods at six months while continuing to breastfeed will increase the risk of transmission of HIV to her infant. This emphasises the need for the further education and engagement of male partners and the community with regard to the advantages of the WHO 2010 infant feeding guidelines, in order to help promote six months' exclusive breastfeeding, followed by continued breastfeeding by HIV-infected lactating mothers. Thirdly, the FGD participants and the majority of the health workers recommended that the mother, rather than the infant, should take ARV drugs during lactation.

Acknowledgments

The authors would like to thank the research study participants; the US National Institutes of Health, the study sponsor (Grant Number AI 069530); the research study members; the Mulago Hospital PMTCT staff; Prof Josaphat Byamugisha, Head, Department of Obstetrics and Gynaecology, College of Health Sciences, Makerere University,

Uganda; Prof Philippa Musoke, Clinical Research Site Leader/ Principal Investigator affiliated to the Makerere University-Johns Hopkins Research Collaboration; Ms Lindy-Ann Wright affiliated to Johns Hopkins University as a finance manager; and the Uganda Ministry of Health.

Conflict of interest

The authors declare that there was no conflict of interest when conducting this study.

References

1. World Health Organization. HIV and infant feeding: update. Geneva: WHO; 2006.
2. World Health Organization. WHO rapid advice. Revised WHO principles and recommendations on infant feeding in the context of HIV. Geneva: WHO; 2009.
3. World Health Organization. Antiretroviral drugs for treating pregnant women and preventing HIV infection in infants. Recommendations for a public health approach. Geneva: WHO; 2010.
4. World Health Organization. Programmatic update: use of antiretroviral drugs for treating pregnant women and preventing HIV infection in infants. Geneva: WHO; 2012.
5. Wamani H, Tylleskär T, Aström AN, et al. Mothers' education but not fathers' education, household assets or land ownership is the best predictor of child health inequalities in rural Uganda. *Int J Equity Health*. 2004;3(1):9.
6. Engebretsen IM, Wamani H, Karamagi C, et al. Low adherence to exclusive breastfeeding in Eastern Uganda: a community-based cross-sectional study comparing dietary recall since birth with 24-hour recall. *BMC Pediatr*. 2007;7:10.
7. Uganda Demographic and Health Survey 2011. Preliminary report. Kampala: Uganda Bureau of Statistics; 2012.
8. Fadnes LT, Engebretsen IM, Wamani H, et al. Need to optimise infant feeding counselling: a cross-sectional survey among HIV-positive mothers in Eastern Uganda. *BMC Pediatr*. 2009;9:2.
9. Lanktree E, Ssebuko A, Alibhai A, et al. Breastfeeding practices of HIV-positive and HIV-negative women in Kabarole district, Uganda. *Matern Child Nutr*. 2011;7(4):378-388.
10. Doherty T, Chopra M, Nkonki L, et al. A longitudinal qualitative study of infant-feeding decision making and practices among HIV-positive women in South Africa. *J Nutr*. 2006;136(9):2421-2426.
11. MacCarthy S, Rasanathan JJK, Nunn A, Dourado I. "I did not feel like a mother": the success and remaining challenges to exclusive formula feeding among HIV-positive women in Brazil. *AIDS Care*. 2013;25(6):726-731.
12. Muluye D, Woldeyohannes D, Gizachew M, Tiruneh M. Infant feeding practice and associated factors of HIV positive mothers attending prevention of mother to child transmission and antiretroviral therapy clinics in Gondar Town health institutions, Northwest Ethiopia. *BMC Public Health*. 2012;12:240.
13. Thairu LN, Pelto GH, Rollins NC, et al. Sociocultural influences on infant feeding decisions among HIV-infected women in rural Kwa-Zulu Natal, South Africa. *Matern Child Nutr*. 2005;1(1):2-10.
14. Tohtoa J, Maycock B, Hauck YL, et al. Dads make a difference: an exploratory study of paternal support for breastfeeding in Perth, Western Australia. *Int Breastfeed J*. 2009;4:15.
15. Kakute PN, Ngum J, Mitchell P, et al. Cultural barriers to exclusive breastfeeding by mothers in a rural area of Cameroon, Africa. *J Midwifery Wom Heal*. 2005;50(4):324-328.
16. Davies-Adetugbo AA. Socio cultural factors and the promotion of exclusive breastfeeding in rural Yoruba communities of Osun State, Nigeria. *Soc Sci Med*. 1997;45(1):113-125.
17. Fjeld E, Siziya S, Katepa-Bwalya M, et al. "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. *Int Breastfeed J*. 2008;3:26.
18. De Paoli M, Manongi R, Helsing E, Klepp KI. Exclusive breastfeeding in the era of AIDS. *J Hum Lact*. 2001;17(4): 313-320.
19. Becquet R, Ekouevi DK, Viho I, et al. Acceptability of exclusive breast-feeding with early cessation to prevent HIV transmission through breast milk. *ANRS 1201/1202 Ditrane Plus*, Abidjan, Cote d'Ivoire. *J Acq Immun Def Synd* 2005;40(5):600-608 .
20. Chesela CS, Hudens MG, Jamieson DJ, et al. Maternal or infant antiretroviral drugs to reduce HIV-1 transmission. *N Engl J Med*. 2010;362(24):2271-2281.