Maternal HIV status and infant feeding practices among Ugandan women

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Abstract

To describe the infant feeding practices in the general population in Uganda, and to assess the impact of maternal HIV status on these practices, a questionnaire was administered to women attending the follow-up clinics for child vaccination. Among the mothers who were still breastfeeding at the time of interview (*N*=838), 61.4% of the HIV-infected women had planned to breastfeed for a maximum of 6 months, compared with 12.1% of the HIV-uninfected women ($p<0.001$). Among the women who were not breastfeeding at the time of interview (*N*=108), 82.5% of the HIV-infected women had stopped breastfeeding within 3 months, compared with 23.5% of the HIV-uninfected women ($p<0.001$). Only 2.1% of HIV-infected women seen up to 14 weeks postnatally practised mixed feeding, compared with 23.6% of HIV-uninfected women ($p<0.001$). After 6 months, however, 30% of the HIV-infected women and 55% of the HIV-uninfected mothers were using mixed feeding, with no significant differences. Programmes for the prevention of mother-to-child transmission of HIV should re-enforce counselling activities to address the issue of early weaning by HIV-infected women, and to support safe breastfeeding up to 6 months.

Keywords: *HIV, breastfeeding, formula feeding, mother-to-child transmission, Uganda.*

Résumé

Pour décrire les pratiques d'alimentation du nourrisson dans la population générale en Ouganda et pour évaluer l'impact de l'état sérologique de la mère sur ces pratiques, un questionnaire a été soumis à des femmes fréquentant des cliniques de suivi pour la vaccination des enfants. Parmi les mères qui allaitaient encore au moment de l'entretien (*N*= 838), 61.4% (35 sur 57) des femmes séropositives avaient prévu d'allaiter pendant un maximum de 6 mois contre 12.1% (95 sur 781) des femmes séronégatives ($p<0.001$). Parmi les femmes qui n'allaitaient pas au moment de l'entretien (*N*=108), 82.5% (33 sur 40) des femmes séropositives avaient arrêté d'allaiter dans les 3 mois contre 23.5% (16 sur 68) des femmes séronégatives ($p<0.001$). Seulement deux femmes séropositives sur 92 (2.1%) vues jusqu'à 14 semaines après la naissance pratiquaient une alimentation mixte contre 184 sur 779 (23.6%) des femmes séronégatives ($p<0.001$). A 6 mois, cependant, 30% (3 sur 10) des femmes séropositives et 55% (88 sur 160) des femmes séronégatives pratiquaient une alimentation mixte du nourrisson, sans différence significative. Les programmes de prévention de la transmission du VIH de la mère à l'enfant devraient renforcer les activités d'assistance psychosociale pour traiter la question du sevrage d'un bébé par les femmes séropositives et soutenir un allaitement sûr jusqu'à 6 mois.

Mots clés: *VIH, allaitement, lait maternisé, transmission de la mère à l'enfant, Ouganda.*

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Introduction

Postnatal transmission of HIV still remains responsible for up to 40% of infections in settings where prolonged breastfeeding is the norm (Coutsoudis *et al.*, 2004). The World Health Organization recommendations on infant feeding by HIV-infected women (WHO-UNICEF-UNAIDS-UNFPA, 2007) include replacement feeding only when it is acceptable, feasible, affordable, safe and sustainable (AFASS conditions). For the other women, exclusive breastfeeding for 6 months (and its interruption thereafter, if AFASS conditions are met) is the recommended choice. This recommendation is based on several studies showing the relatively low risk of transmission of HIV associated with exclusive breastfeeding in the first months of life, compared with all types of mixed feeding (Becquet *et al.*, 2008; Coovadia *et al.*, 2007; Coutsoudis, Pillay, Spooner, Kuhn & Coovadia, 1999; Iliff *et al.*, 2005; Kuhn *et al.*, 2007).

Although different strategies, including antiretroviral prophylaxis to either infants or mothers during breastfeeding, have been proved to be effective (Bedri *et al.*, 2008; Kilewo *et al.*, 2008; Kumwenda *et al.*, 2008; Thomas *et al.*, 2008), high rates of exclusive breastfeeding can be promoted (Su *et al.*, 2007) to start reducing the rate of transmission before a drug-mediated strategy is included in the specific guidelines.

Uganda has adopted the WHO policy on breastfeeding, and HIV-infected women are given information about different feeding options and risks and benefits of breastfeeding (Prevention of Mother-to-Child Transmission [PMTCT] National Policy, Ministry of Health, 2006). Ultimately, the woman in consultation with other significant people and the counsellor chooses the most suitable feeding option. However, there is little information on the prevalence of different feeding practices and on the adherence over time to these practices among HIV-infected women, and in the general population, where the antenatal seroprevalence is 6% (Musinguzi *et al.*, 2009). The aim of our study was therefore to improve our knowledge of the current feeding practices in three different areas of the country (northern, mid-western, and in the urban area of the capital city, Kampala, in the south), in order to better understand the gaps between national PMTCT policy and practice.

Methods

A cross-sectional study using structured interviews was conducted in 3 areas: Kampala City (Nsambya Hospital and satellite clinics), Hoima (Hoima Hospital and satellite clinics), and Kitgum (St Joseph's Hospital). Over a 4-week period, a questionnaire was administered to women attending the young child clinics for child vaccination or vitamin A administration, at 1 week, 6 weeks, 10 weeks, 14 weeks, 6, and 9 months after delivery, and every 3 months thereafter up to 24 months. The questionnaire was structured, with a first section describing the socio-demographic characteristics of the mother; a second section collecting data on infant feeding practices, including the current feeding practice (referring to the last week of feeding), breastfeeding duration, the weaning process, complementary feeding patterns, and other people's influences on feeding practices; a third section related to HIV infection (HIV status, partner notification, and beliefs about HIV transmission through breast milk). Reported HIV status was always cross-checked against the information on either the antenatal card or the child card, or other clinical documentation (i.e. clinical register of HIV clinics).

The study participants were interviewed in the local languages in Kitgum and Hoima (Acholi and Runyoro, respectively), and in English in Kampala, and answers reported on an English questionnaire. Before starting the study, the data collectors in Kitgum and Hoima agreed on the terms in the local languages to be used in the interviews. If evidence of incorrect practices emerged during the interviews, counselling was offered to the women to help them in modifying these practices.

Data analysis

Data were checked and entered using the MS Access programme. Women were first classified according to their HIV serostatus, and then analysed for their socio-demographic characteristics and for their general feeding practices (among those still breastfeeding and those who had already stopped breastfeeding). Subsequently, women were grouped by study visit and feeding practices analysed for each study visit. The proportions of infants receiving the different feeding options at the different time points were obtained. For this analysis, all answers about food items were grouped in five feeding categories: exclusive breastfeeding (EBF), with no other food or drink in addition to breast milk; mixed feeding (MF), including either liquids or solids or other milk together with breast milk; formula feeding (FF) including exclusive replacement feeding; cow's milk; and solid foods. 'Predominant breastfeeding' (the administration of breast milk and water-based fluids only) was classified as 'mixed feeding', since this practice was reported by only 4.4% of the interviewed women ('strict' exclusive breastfeeding is generally strongly recommended during feeding counselling in the country). Statistical analysis of the data was performed using SPSS version 15.0 for Windows. To highlight significant statistical differences according to the serostatus of the mothers, statistical comparisons used Student's t test for quantitative continuous variables and Fisher's exact test or the chi square test for categorical data.

Ethics

The study was reviewed by the Institutional Review Board/ Ethics Committee of St Raphael of St. Francis Hospital Nsambya in Kampala. Verbal consent was obtained from women to be interviewed.

Results

Sociodemographic characteristics of the general population

A total of 1 513 women were interviewed (10 women were attending the visit 1 week after delivery, 392 were seen at the 6-weeks visit, 242 at 10 weeks, 314 at 14 weeks, 175 at 6 months, 234 at 9 months, 74 at 12 months, 6 at 15 months, 6 at 18 months, and 60 at 24 months).

More than half (57%) of the women were recruited from Kampala, a quarter (26%) from Hoima and 17% from Kitgum. The overall reported seroprevalence was 8.6% (131/1 513). Only 96 women (6.3% of the total population) did not know their HIV status. These women lived more often in rural areas in comparison to the other groups (39/96 or 40.6%, compared with 336/1 417 or 23.7% of

women with known serostatus, $p<0.001$), more frequently had an income of less than 10$ per month (34/70 women with answer on this topic or 48.5%, compared with 359/970 or 37% of the women with known serostatus, $p=0.05$), and were significantly less educated (23/95 or 24.2% had no education, compared with 186/1 401 or 13.2% of the women with known serostatus, $p=0.005$). Women with unknown HIV status were excluded from the subsequent analyses, leaving a total of 1 417 evaluable women (131 HIV-infected and 1 286 HIV-uninfected women). The mean age of the study population was 26.7 years (29.2 years for HIV-infected, and 26.5 years for HIV-uninfected women, $p<0.001$). Women in the study had received a mean of 8.5 years of education (6.9 yrs for HIV-infected, and 8.7 yrs for HIV-uninfected women, $p<0.001$); 974 out of 1 417 (68.7%) lived in urban and peri-urban areas; 1 311 (82.5%) were married or cohabitants, 491 (34.6%) were housewives and 183 (12.9%) worked in agriculture; 669 (47.1%) lived with less than 60$ per month (92/131 or 70.2% of the HIV-infected, and 577/1 286 or 45.1% of the HIV-uninfected, $p<0.001$). More than three-quarters of the HIV-infected women (95 out of 131), had informed their partners of their status; among those who reported not to have informed their partner (26) only 7 had planned to inform their partners in the future. Fifty-three per cent of the partners of the HIV-infected women had been tested for HIV.

Infant feeding practices

Feeding practices are summarised in Table 1. The vast majority of the infants had ever been breastfed (94.6 %). All the 28 infants who were never breastfed were born to HIV-infected mothers. HIV-infected women reported more frequently to have had difficulties in breastfeeding compared with HIV-uninfected mothers (24/102 or 23.5%, versus 185/1 275 or 14.5%, $p=0.02$), mainly due to illness of the mother (50% of the cases). Among the mothers who were still breastfeeding at the time of interview ($N=838$), 61.4% (35/57) of HIV-infected women had planned to breastfeed for a maximum of 6 months, compared with 12.1% (95/781) of HIV-uninfected ($p<0.001$). A total of 570/838 (72.9%) HIV-uninfected mothers had planned to breastfeed for more than 12 months. Among the women who were not breastfeeding at the time of interview ($N=108$), 82.5% (33/40) of the HIV-infected women had stopped breastfeeding within 3 months, compared with 23.5% (16/68) of the HIV-uninfected women ($p<0.001$). Ninety-five per cent (38/40) of the infants born to HIV-infected mothers and weaned at the time of interview had been weaned within 6 months. The reasons for weaning within 6 months were fear of transmitting HIV (62.1% of the cases), or on advice of the health providers (reported by 20.7% of the women). Considering women who were still breastfeeding as well as those who had stopped breastfeeding at the time of interview, 24/97 (24.7%) of the HIV-infected women had breastfed (or had planned to breastfeed) for longer than 6 months.

The feeding practices were then analysed according to the specific postpartum visit (Table 2). The majority of women were seen at the young child clinics at 6, 10 and 14 weeks, and 6 and 9 months. There were very few women at the other time points (cumulative number = 144). Exclusive breastfeeding was the most frequent feeding modality overall up to 14 weeks (about 70% of the women), and was still practised by a significant proportion of mothers (39%) at 6 months. Only 2/92 (2.1%) HIV-infected women seen up to 14 weeks postnatally practised mixed feeding, compared with 184/779 (23.6%) HIV-uninfected women ($p<0.001$). At month 6, however, 30% (3/10) of the HIV-infected women and 55% (88/160) of the HIV-uninfected mothers were mixed feeding, with no significant differences. Overall, the reported use of either formula feeding or cow's milk (56/130, or 43% of the HIV-infected women) was significantly higher in comparison to HIV-uninfected women (61/1274 or 4.8%, $p<0.001$). Among the HIV-infected women the use of cow's milk (40/130 or 30.8%) was much higher than the use of formula milk (16/130 or 12.3%, $p<0.001$), and was more prevalent in Hoima, where the PMTCT programme supports the use of cow's milk (for the few women not willing to breastfeed and unable to use formula milk), and often provides it free of charge. There, mothers were counselled about the risks associated with the use of cow's milk and instructed on the correct water-dilution (according to the age of the infants).

Discussion

In order to promote safe infant feeding strategies for HIV-infected mothers, it is important to know the current feeding practices in the general and the infected population, as well as the factors that may have an influence on them. In this sense our study provides information on the prevalence of the different feeding behaviours among women in Uganda.

Our first important finding was about the duration of breastfeeding. Since prolonged breastfeeding after 6 months has been shown to be significantly associated with an increased risk of transmission (Becquet *et al.*, 2008), the fact that only 24.7% of the HIV-infected women in our study had planned to breastfeed (or had breastfed) for more than 6 months suggests that the message on the importance of the shortening of breastfeeding has been accepted. In fact, the general population in the country had a significanly longer duration of breastfeeding, in agreement with previous reports (Pool, Nyanzi &.Whitworth, 2001; Wamani, Åstrom, Peterson, Tylleskär & Tumwine, 2005). A study in Zimbabwe yielded similar results, showing that infants born to HIV-uninfected mothers were weaned significantly later than HIV-exposed infants, indicating a response to HIV-related infant feeding recommendations (Orne-Gliemann *et al.*, 2006). A recent study performed among HIV-infected Ugandan women also showed that a shorter duration of breastfeeding was associated with a higher level of education and with participation in PMTCT programmes (Fadnes *et al.*, 2009b). We observed that among those that had stopped breastfeeding, more than 80% of the mothers stopped breastfeeding within 3 months. Similarly, in a different study in Zimbabwe it was found that HIV-infected women were so worried about the risk of HIV transmission that they stop breastfeeding early, without taking into account the possible risks to the children's health of early weaning (Lunney *et al.*, 2008). However, these and our findings underline the need to reinforce counselling about optimal duration of breastfeeding for HIV-infected women, since recent studies have clearly shown that breastfeeding should be continued for 6 months and that a duration of only 3 - 4 months was associated with an increased rate of diarrhoea and death (Kuhn *et al.*, 2008; Onyango *et al.*, 2007).

Analysing the feeding modalities at the different time points, we found, also among HIV-uninfected women, a high rate of exclusive breastfeeding (up to 39% at 6 months). Previous studies

Table 1. Feeding practices among HIV-infected and HIV-uninfected women (percentages, in brackets, are calculated out of the total number of completed questions)

	All	HIV+	HIV-
Ever breastfed (*N*=1412)			
Yes	1 384 (94.6)	102 (77.9)	1 282 (100)
No	28 (1.9)	28 (21.5)	
Given colostrum (*N*=1407)			
Yes	1 282 (90.4)	93 (71.0)	1 189 (92.5)
No	125 (8.8)	38 (29.0)	87 (6.8)
Unknown	10 (0.7)		10 (0.8)
Difficulties in breastfeeding (*N*=1377)			
Yes	209 (15.2)	24 (23.5)	185 (14.5)
No	11 68 (84.8)	78 (76.5)	1090 (85.5)
Type of difficulty (more than one answer was allowed)			
Mother sick	49 (23.2)	12 (50)	37 (19.8)
Infant breastfed too often	7 (3.3)		7 (3.7)
Infant not able to suckle	12 (5.7)		12 (6.4)
Infant lesions in the mouth	8 (3.8)	4 (16.6)	4 (2.1)
Mother thought did not have enough milk	114 (54.0)	5 (20.8)	109 (58.2)
Infant had other sickness	5 (2.3)	1 (4.1)	4 (2.1)
Other	16 (7.6)	2 (8.3)	14 (7.5)
For mothers who were still breastfeeding (*N*=838)			
Planned duration of breastfeeding			
Less than 6 months	9 (1.1)	4 (7.0)	5 (0.6)
Maximum 6 months	121 (14.4)	31 (54.4)	90 (11.5)
6 - 12 months	133 (15.8)	17 (29.8)	116 (14.9)
12 - 24 months	265 (31.6)	3 (5.3)	262 (33.5)
More than 24 months	261 (31.1)	1 (1.8)	260 (33.3)
Unknown	49 (5.8)	1 (1.8)	48 (6.1)
For mothers who had stopped breastfeeding (*N*=108)			
Time of breastfeeding interruption			
Within 6 weeks	24 (22.2)	16 (40.0)	8 (11.8)
6 weeks - 3 months	25 (23.1)	17 (42.5)	8 (11.8)
3 months - 6 months	19 (17.6)	5 (12.5)	14 (20.6)
6 months - 9 months	5 (4.6)	1 (2.5)	4 (5.9)
9 months - 12 months	21 (19.4)	1 (2.5)	20 (29.4)
12 months - 24 months	14 (12.9)		14 (20.6)
Reason for stopping breastfeeding			
Fear of transmitting HIV	58 (29.4)	54 (62.1)	4 (3.6)
Infant no longer wanted/old enough	40 (20.3)	1 (1.1)	39 (35.4)
Advised by health provider	23 (11.6)	18 (20.7)	5 (5.7)
Advised by husband/partner	13 (6.6)	8 (9.2)	5 (5.7)
Other reason	63 (31.9)	6 (6.9)	57 (51.8)
Duration of weaning process (*N*=99)			
Few days	28 (28.2)	6 (16.7)	22 (34.9)
One week	19 (19.2)	5 (13.9)	14 (22.6)
More than one week	52 (52.5)	25 (69.4)	27 (42.9)
Knowledge of breastfeeding as a route of transmission of HIV (*N*=1 357)			
Yes	1 248 (91.9)	128 (97.7)	1 120 (87.1)
No	4 (0.3)		4 (4.9)
Unknown	105 (7.7)	3 (2.3)	102 (7.9)
Advice in the event of problems associated with breastfeeding			
Health personnel	749 (52.9)	91 (69.5)	658 (51.2)
Partner	223 (15.7)	9 (6.9)	214 (16.6)
Mother	207 (14.6)	11 (8.4)	196 (15.2)
Mother-in-law	110 (7.8)	6 (4.6)	104 (8.1)
Friend	56 (4.0)	2 (1.5)	54 (4.2)
Other/unknown	72 (5.1)	12 (9.1)	60 (7.7)

Table 2. Feeding modalities at the different postpartum visits for HIV-infected and HIV-uninfected women

Visit	All	HIV+ (% of HIV+ out of the total number of women interviewed at the visit)	HIV-
6 weeks	*N*=363	*N*=51 (14%)	*N*=312
EBF*	269 (74.1)	27 (52.9)	242 (77.6)
Mixed feeding	65 (17.9)	1 (2.0)	64 (20.5)
Formula feeding	10 (2.8)	6 (11.8)	4 (1.3)
Cow milk	18 (5.0)	17 (33.3)	1 (0.3)
Solid foods	1 (0.3)	0	1 (0.3)
10 weeks	*N*=222	*N*=21 (9.5%)	*N*=201
EBF	168 (75.7)	10 (47.6)	158 (78.6)
Mixed feeding	40 (18.0)	0	40 (19.9)
Formula feeding	6 (2.7)	3 (14.3)	3 81.5)
Cow milk	8 (3.6)	8 (38.1)	0
Solid foods	0	0	0
14 weeks	*N*=286	*N*=20 (6.9%)	*N*=266
EBF	191 (66.8)	12 (60.0)	179 (67.3)
Mixed feeding	81 (28.3)	1 (5.0)	80 (30.1)
Formula feeding	3 (1.1)	2 (10.0)	3 (1.1)
Cow milk	1 (0.3)	5 (25.0)	3 (1.1)
Solid foods	8 (2.8)	0	1 (0.4)
6 months	*N*=170	*N*=10 (5.9%)	*N*=160
EBF	67 (39.4)	4 (40.0)	63 (39.4)
Mixed Feeding	91 (53.5)	3 (30.0)	88 (55.0)
Formula Feeding	5 (2.9)	1 (10.0)	4 (2.5)
Cow Milk	4 (2.4)	1 (10.0)	3 (1.9)
Solid foods	3 (1.8)	1 (10.0)	2 (1.3)
9 months	*N*=219	*N*=23 (10.5%)	*N*=196
EBF	12 (5.5)	0	12 (6.1)
Mixed feeding	178 (81.3)	5 (21.7)	173 (88.3)
Formula feeding	8 (3.7)	3 (13.0)	5 (2.6)
Cow milk	9 (4.1)	6 (26.1)	3 (1.5)
Solid foods	12 (5.5)	9 (39.1)	3 (1.5)
Overall**	*N*=1 404	*N*=130 (9.2%)	*N*=1 274
EBF	722 (51.4)	53 (40.7)	669 (52.5)
Mixed feeding	530 (37.7)	10 (7.7)	520 (40.8)
Formula feeding	43 (3.1)	16 (12.3)	27 (2.1)
Cow milk	74 (5.3)	40 (30.7)	34 (2.6)
Solid foods	35 (2.5)	11 (8.4)	24 (1.9)

* Exclusive breastfeeding

** Including all visits

have analysed feeding practices in similar settings: it has been reported that approximately 40% of the women in Zimbabwe introduced fluids/foods other than breast milk at 6 months and above (Orne-Glieman *et al.*, 2006); in Uganda, Wamani et al. (2005) reported that 35% of the infants between 3 and 5 months were exclusively breastfed, and other authors (Poggensee *et al.*, 2004) reported that 48% of the children aged four months in the country had been exclusively breastfed. The Uganda Demographic and Health Survey 2000-2001 (Uganda Bureau of Statistics and ORC Macro, 2001) also showed that at 4 - 6 months only 57% of mothers practised mixed feeding. Although we cannot exclude the possibility that there might have been some overestimation of exclusive breastfeeding in our sample (maybe due to the last week recall), it seems that our data in the general population are comparable to what was previously reported in similar settings.

Overall, it is important to underline that mixed feeding was significantly less practised by the HIV-infected women compared with the HIV-uninfected, in contrast to the findings of a recent study conducted in Eastern Uganda (Fasnes *et al.*, 2009a), showing that the same proportion (approximately 50%) of HIV-infected and HIV-uninfected mothers gave mixed feeding to their infants under 6 months old. We believe that differences in the characteristics of the population (our women were significantly more educated that those in the study mentioned above) may explain this difference.

In our study only 2.1 % of exposed children had been mixed fed in the first 14 weeks of life, compared with 23.6 % of the children born to HIV-uninfected mothers; however, at 6 months, up to

30% of HIV-infected women reported practising mixed feeding. This finding underlines the difficulty, for a significant proportion of women, in fully complying with the national PMTCT policy. In a study in South Africa inadequate support from the health workers and the pressure from family members to introduce other liquids were identified as factors affecting the adherence to safe infant practices (Doherty, Chopra, Nkonki, Jackson & Persson, 2006). However, in our study we observed a high proportion of women who had disclosed their status to their partners, right across the different age groups of children, suggesting that lack of disclosure was not likely to have played a role.

Our study has several possible limitations, including the fact that we did not have the same proportion of HIV-infected women at the different time points. Other limitations include a cross-sectional design, and the estimations of infant feeding practices based on self-reported data collected during a single interview. Further, the number of HIV-infected women was small, affecting the power to detect significant differences and correlates. We cannot also exclude the possibility that there might have been under-reporting of mixed feeding practices, and perhaps over-reporting of exclusive breastfeeding by HIV infected women, in order to appear to comply with PMTCT policy. However, since PMTCT programmes in the study sites had been running for more than 3 years, the study was able to get some perspectives on PMTCT key activities over these periods. In conclusion, the majority of women interviewed at the young child clinics knew their HIV status and breastfed their babies in line with national breastfeeding recommendations for HIV infected and uninfected women.

Thus, the following recommendations can be made: firstly, partner organisations supporting PMTCT programmes in Uganda should address the issue of early weaning by HIV-infected women; secondly, PMTCT programmes should involve partners, including HIV-infected women and the community, to find solutions to prolong breastfeeding safely up to 6 months; and thirdly, health care providers should re-enforce messages supporting the practice of exclusive breastfeeding for 6 months, and feeding counselling should be provided at all visits to young child clinics.

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