Adherence to infant-feeding choices by HIV-infected mothers at a Nigerian tertiary hospital: the pre-"rapid advice" experience

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Abstract

Objectives: The study examined adherence to infant-feeding choices made by human immunodeficiency virus (HIV)-infected mothers at a Nigerian tertiary hospital prior to implementation of the "rapid advice" guideline, i.e. the revised World Health Organisation principles and recommendations on infant feeding in the context of HIV.

Design: This was a longitudinal descriptive study.

Subjects and settings: The study was conducted on mother-infant pairs recruited from the prevention of mother-to-child transmission (PMTCT) of HIV programme of Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria. Final analyses included 142 mother-infant pairs.

Outcome measures: Adherence to a prenatal infant-feeding choice and the infant's HIV status at six months of age were determined.

Results: On enrolment, 73% (n = 103) of the mothers chose exclusive formula feeding (EFF), and 28% (n = 39) exclusive breastfeeding (EBF) for the first six months of life. Of the mothers who chose EBF, the actual practice of EBF declined from 88% at two weeks to 21% at six months, while EFF with correctly reconstituted infant formula decreased from 55% to 8% over the same period. The proportion of mothers who switched over to early complementary feeding increased from 8% at six weeks to 80% at six months in the EBF group, and 2% at two weeks to 92% at six months in the EFF group. Major reasons for nonadherence to their initial choice were fear of the mother-to-child transmission (MTCT) of HIV (65%) and non-affordability of the formula (97%) in the EBF and EFF groups, respectively. Factors significantly associated with adherence to their initial choice included having individual prenatal infant-feeding counselling sessions, being married, having a small number of children, being of higher socio-economic status and the mother's educational status. However, only socio-economic status remained significant after logistic regression analysis was applied. The total MTCT of HIV rate was 1% at six months.

Conclusion: Adherence to either EFF or EBF in this study was low, owing to early breastfeeding cessation and the inability to sustain EFF.

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Introduction

Adherence to infant-feeding recommendations is critical for the human immunodeficiency virus (HIV)-free survival of infants of HIV-infected women. HIV-infected mothers in developing countries often face complex challenges which influence their choice of infant-feeding practice.[1] Mothers who are unable to cope with the challenges may succumb to practices which fall outside the infant-feeding recommendations, thus jeopardising their infants' HIV-free survival.

Based on accumulating evidence on the adverse effects of the avoidance or early cessation of breastfeeding in developing countries, and the benefits of antiretroviral (ART) interventions in reducing the mother-to-child transmission (MTCT) of HIV through breast milk, the World Health Organization (WHO)[2] released the "rapid advice" guideline, i.e. revised WHO principles and recommendations on infant feeding in the context of HIV in 2009. The use of ART prophylaxis during the breastfeeding period until one week after all exposure to breast milk has stopped is recommended in this guideline. It also recommends that HIV-infected mothers intending to breastfeed should do so exclusively for the first six months, and should introduce appropriate complementary food thereafter, and continue breastfeeding until the infant is 12 months of age.

It was recommended in the "rapid advice" guideline that national health authorities should adopt, principally support and promote a single infant-feeding practice which ensures the HIV-free survival of HIV-exposed infants in their communities. In response, Nigeria's

Federal Ministry of Health directed that all HIV-infected mothers should be counselled to exclusively breastfeed their infants for the first six months of life, introduce adequate complementary food thereafter, and continue breastfeeding until the infant was one year of age.[3] Thus, the approach of advising mothers that breastfeeding and replacement feeding were equal options was abandoned.[3] However, adherence poses a major obstacle to the success of the national guideline, given the very low exclusive breastfeeding (EBF) rate in the country. Although breastfeeding is a widely accepted infant-feeding choice in Nigeria, only 13% of infants in the general population are exclusively breastfed in the country.[4,5] Breastfeeding HIV-infected mothers in Africa also experience pressure to practise mixed feeding (i.e. give their infant water, a herbal mixture or other food, in addition to breastmilk during the first six months of life), and this increases the risk of the mother-to-child transmission (MTCT) of HIV.[1,6,7]

Although replacement feeding prevents the MTCT of HIV through breast milk, it is often associated with a high risk of morbidity and mortality in developing countries.[2,3] In addition, replacement feeding is often not acceptable, affordable, feasible, sustainable and safe (AFASS) in developing countries.[1,6,7]

The highest paediatric HIV burden, and the second highest burden of HIV infection in women of childbearing age, globally, is accounted for in Nigeria.[8] Therefore, the country was listed as one of 22 priority countries targeted for the elimination of the MTCT of HIV by 2015.[9] However, this target was not achieved, and Nigeria was recently reported to account for approximately one third of all new paediatric HIV infections in priority countries with a MTCT of HIV rate of 28%.[9,10] To combat this negative trend, factors which hinder the success of the prevention of mother-to-child transmission (PMTCT) of HIV in the country must be clearly understood and addressed.

The aim of this study was to describe adherence to an informed choice of infant feeding by HIV-infected mothers at a public tertiary teaching hospital in Nigeria. The results serve as a very useful motivational tool for infant-feeding counselling, and the follow-up of HIV-infected mothers in order to ensure optimal adherence to infant-feeding guidelines.

Method

Study area

This study was conducted at Nnamdi Azikiwe University Teaching Hospital, a public tertiary hospital in Nnewi, Anambra State, south-east Nigeria, between January and October 2012. There is an HIV seroprevalence rate of 9% in Anambra State, and EBF rate is low (4% by six months of age) among mothers in the general population.[5,11] Nnamdi Azikiwe University Teaching Hospital serves as a referral centre to the entire Anambra State (of approximately 5 million people) and parts of the neighbouring states. The PMTCT of HIV package in Nnamdi Azikiwe University Teaching Hospital includes voluntary counselling and testing, ART interventions for the PMTCT of HIV during pregnancy and breastfeeding, infant-feeding counselling and support, modified obstetrics care, an infant follow-up programme and family planning services. HIV-infected mothers who enroll for the PMTCT of HIV programme at Nnamdi Azikiwe University Teaching Hospital are counselled prenatally on infant-feeding recommendations for HIV-infected mothers. The reinforcement of infant-feeding counselling is performed immediately after delivery, and at each infant follow-up visit. In the "pre-rapid advice" era (i.e. prior to the implementation of the 2009 WHO guideline), HIV-infected mothers were required to make an informed choice prenatally on whether to practise either EBF or replacement feeding during the first six months of their infant's life. Free infant formula was not provided to those mothers who chose to practise replacement feeding, and these mothers were expected to meet the AFASS criteria.

Study design and subject selection

A longitudinal descriptive study was conducted on 170 mother-infant pairs. Sample size calculation was based on a standard formula using HIV seroprevalence among women attending the ante-natal clinic in Nnamdi Azikiwe University Teaching Hospital as a proportion of the target population.[12] Eligible mothers were drawn from the pool of HIV-infected mothers who enrolled in the Nnamdi Azikiwe University Teaching Hospital PMTCT of HIV programme during pregnancy. All consecutive eligible mother-newborn pairs were recruited until the required sample size was attained. Mothers who participated in the study were prenatally counselled on infant-feeding recommendations for HIV-infected mothers using the older guideline that promoted both exclusive replacement feeding and exclusive breastfeeding as equal options. Enrolment started before implementation of the new updated national recommendations on HIV and infant feeding[13] at the centre.

Data collection

The enrolment of subjects was performed as soon as possible, within 24 hours of delivery. The mothers were interviewed using a semi-structured, pre-tested questionnaire. Information on socio-demographic characteristics, the mothers' obstetric history, infant data and choice of infant feeding were collected on enrolment. Data on the actual infant-feeding practices were collected during follow-up visits at two and six weeks, and then at three and six months after delivery. EBF was defined as giving the infant breast milk only (without water, herbal mixtures or other feeds), while exclusive formula feeding (EFF) was defined as giving the infant formula only. The formula was documented as having been correctly prepared if the manufacturer's recommendation was adhered to. Any mother found to use an inappropriate infant-feeding practice, such as the provision of mixed feeding, early complementary feeding, incorrect formula reconstitution, a small volume of feeds and a poor breastfeeding technique was referred to trained infant-feeding counsellors working in the follow-up clinic for infant-feeding counselling to be reinforced.

The socio-economic class of the family was determined using the parents' occupation and highest educational attainment, as described by Oyedeji.[14] The HIV status of the infants was determined at six weeks and at six months using DNA-PCR technology on a dried blood spot sample. The mothers were reminded of their appointments through telephone calls and text messages.

Data analyses

Data analysis was carried out using SPSS® version 17. Descriptive statistics were presented as frequencies and percentages. Using two weeks as a reference period, the relative percentage change in the proportion (P) of mothers who adhered to their initial choice of infant feeding between two weeks and six months was calculated using the formula: $P_{6\ months} - P_{2\ weeks} \div P_{2\ weeks} \times 100$. Adherence and factors associated with adherence to infant-feeding choices were assessed using the chi-square test. The predictive value of factors found to be positive in the chi-square test was determined using multinomial logistic regression analysis. The level of statistical significance was set at a p-value of < 0.050.

Ethical considerations

Approval was obtained from the Research Ethics Committee of Nnamdi Azikiwe University Teaching Hospital. The mothers provided written informed consent. Participation was voluntary, and financial inducement was not involved. The participants were assured that there would be no repercussions to them or their infants if they withdrew from the study at any stage. The collected information was handled with strict confidentiality.

Results

Twenty-eight (17%) of the 170 mother-infants pairs recruited for the study were excluded from the final analysis owing to incomplete data. Twenty-one (12%) defaulted on follow-up visits, while 7 (4%) were lost to follow-up, and could not be contacted on the telephone numbers provided. The home-based care unit was notified to track the seven pairs who were lost to follow-up. Final analysis was performed on 142 mother-infant pairs on whom there was complete data.

The subjects

A birthweight of ≥ 2.5 kg (91%, n = 129) was recorded for the majority of the infants who were term babies (97%, n = 138). One hundred and ten (78%) were delivered by spontaneous vertex delivery, 1 (1%) by breech extraction and 31 (22%) by Caesarean section. Information on their families is shown in Table I. Nearly half of the infants (46%, n = 65) were of low socio-economic class, 77% (n = 110) of their mothers had attained at least secondary school education, and 43% (n = 58) of their fathers were HIV negative. Half of the infants (50%) were from families with 1-2 living children, 9 (6%) had at least one HIV-positive sibling, and almost one third came from families who had lost 1-2 children to HIV or related ailments.

The background characteristics of the mothers are presented in Table II. Almost all of the mothers (98%) disclosed their status, and 95% of their partners were aware of their HIV-positive status. More than half (55%) had booked for PMTCT of HIV services during the second trimester of their pregnancy, while half of them had previous experience of PMTCT of HIV programme. All of the mothers were on ART during their index pregnancy.

Table I: The social characteristics of the infants of HIV-positive mothers

Characteristics	n = 142 n (%)
The mothers' marital status (n = 142)	
Married	135 (95)
Single	2 (1)
Widowed	5 (4)
Divorced or separated	0 (0)
The mothers' educational status (n = 142)	
No formal education	2 (1)
Primary	30 (21)
Secondary	81 (57)
Tertiary	29 (20)
The fathers' educational status (n = 135)	
No formal education	1 (1)
Primary	57 (42)
Secondary	62 (46)
Tertiary	15 (11)
The father's HIV status (n = 135)	
Positive	63 (47)
Negative	58 (43)
Unknown	14 (10)
Socio-economic class (n = 142)	
High	18 (13)
Middle	59 (42)
Low	65 (46)
Siblings' HIV status (n =142)	
At least one sibling who was HIV positive	9 (6)
All negative	84 (59)
Unknown status	11 (8)
No sibling	38 (27)
Number of children in the family (n =142)	
1-2	71 (50)
3-4	60 (42)
≥ 5	11 (8)
Deceased siblings due to HIV or related ailments (n = 142)	
0	91 (64)
1-2	44 (31)
3-4	7 (5)

HIV: human immunodeficiency virus

Infant-feeding choices on enrolment

The majority of the mothers chose EFF (73%, n = 103), while 28% (n = 39) chose EBF for the first six months of their infant's life. Fifty-seven per cent (n = 81) of the mothers made the choice alone, the fathers were involved in the decision-making process in 42% of cases (n = 60), while other relations or friends made the choice in 1% (n = 1) of cases. Most of the mothers (93%, n = 132) were sure that their partners supported their infant-feeding choice. Major

Table II: Background characteristics of the HIV-positive mothers (n = 142)

Characteristics	n (%)
Gestational age at booking (n = 142)	
First trimester	42 (30)
Second trimester	78 (55)
Third trimester	22 (16)
Individualised infant-feeding counselling sessions (n = 142)	
No	92 (65)
Yes	50 (35)
Previous experience of PMTCT of HIV programme (n = 142)	
0	70 (49)
1-2	46 (47)
3-4	6 (4)
Use of antiretroviral drugs (n = 142)	
During pregnancy	139 (98)
Peripartum	3 (2)
Time of antiretroviral drug commencement (n = 142)	
Second trimester	58 (41)
Third trimester	15 (11)
Before pregnancy	66 (47)
Peri-partum	3 (2)
Serostatus disclosure (n = 142)	
Yes	139 (98)
No	3 (2)
To whom their HIV status was disclosed (n = 139)	
Husband only	67 (48)
Husband, parents and/or siblings	57 (41)
Husband and husband's family	8 (6)
Parents, siblings or friends only	7 (5)
The infant-feeding choice (n = 142)	
EBF	39 (28)
EFF	103 (73)
Partner's support of infant-feeding choice (n = 142)	
Yes	132 (93)
No	1 (1)
Not sure	9 (6)
Reason for choosing EBF (n = 39)	
To avoid the suspicion of having an HIV-positive status	20 (51)
Cannot afford formula	15 (39)
For the health benefits of breast milk	4 (10)
Reason for choosing EBF (n = 103)	
Fear of MTCT of HIV	93 (90)
Advice by health workers	8 (8)
Breast problems	2 (2)

EBF: exclusive breastfeeding, EFF: exclusive formula feeding, HIV: human immunodeficiency virus, MTCT: mother-to-child transmission, PMTCT: prevention of mother-to-child transmission

reasons given for choosing EBF were to avoid the suspicion of the mother having an HIV-positive status and consequent stigmatisation (51%, n = 20) and non-affordability of the infant formula (39%, n = 15). Most of the mothers (90%, n = 93) who chose EFF did so because they were afraid of the MTCT of HIV through their breast milk.

Changes in the actual feeding practices during follow-up visits

The actual infant-feeding practices of the mothers, documented at each follow-up visit, are shown in Table III. Of the 39 mothers who chose EBF on enrolment, 10% (n = 4) switched over to formula feeding within two weeks of delivery, but could not sustain feeding their infants with formula beyond three months. EBF declined from 88% at two weeks to 21% at six months (Table III). Conversely, the proportion of mothers who stopped breastfeeding and switched over to early complementary feeding progressively increased from 8% at six weeks to 80% at six months. Using two weeks as a reference period, the relative percentage change in the proportion of mothers who adhered to their initial EBF choice at six months was –77%.

Of the 103 mothers who chose EFF on enrolment, the proportion who exclusively fed their infants with the correctly reconstituted formula decreased from 55% at two weeks to 8% at six months. Conversely, those who switched over to complementary feeding increased from 2% at two weeks to 92% at six months. Using two weeks as a reference period, the relative percentage change in the proportion of mothers who adhered to their initial EFF choice at six months was –86%.

At six months, 89% (n = 126) of all the infants in the sample were already receiving complementary food. Most of the infants receiving complementary food (98%, n = 124) were being fed with homemade pap (local porridge made from fermented maize or guinea corn), while 2% (n = 2) were being given commercially processed complementary food. The food was fortified with commercial infant formula for the majority of these infants (89%, n = 112), while the food for 11% (n = 14) was fortified with soy bean milk and or groundnut paste.

The rate of mixed feeding was low in the sample (4%, n = 6). One mother was practicing mixed feeding in both EBF and EFF groups at the two-week follow-up visit. At six-week visit, two mothers were also practicing mixed feeding in these two groups. All of the mothers who practised mixed feeding started doing so within five weeks of delivery of their infant. All of the EFF mothers who practised mixed feeding did so to avoid suspicion being raised about their HIV-positive status and consequent stigmatisation, while the EBF mothers practised mixed feeding either as a result of pressure to do so (33%, n = 1) or because they had difficulty with lactation (68%, n = 2). The difference in the rate of mixed feeding between the EFF and EBF mothers was not statistically significant.

Reasons given by the mothers for nonadherence to their initial choice

The reasons given by the nonadherent EFF mothers for not giving their infants formula exclusively for the first six months of their

Table III: Actual infant-feeding practices of the mothers at the different follow-up visits

Nature of the feed	Infants' ages at the follow-up visits			
	2 weeks	6 weeks	3 months	6 months
	n (%)	n (%)	n (%)	n (%)
EFF group (n = 103)				
Correctly reconstituted formula	57 (55)	63 (61)	38 (37)	8 (8)
Diluted formula	31 (30)	14 (14)	5 (5)	0 (0)
Concentrated formula	11 (11)	3 (3)	1 (1)	0 (0)
Complementary feeding	2 (2)	20 (19)	58 (56)	95 (92)
Exclusive breastfeeding	1 (1)	1 (1)	1 (1)	0 (0)
Mixed feeding	1 (1)	2 (2)	0 (0)	0 (0)
EBF group (n = 39)				
Exclusive breastfeeding	34 (87)	32 (82)	27 (69)	8 (21)
Exclusive formula feeding	4 (10)	2 (5)	2 (5)	0 (0)
Complementary feeding	0 (0)	3 (8)	10 (26)	31 (80)
Mixed feeding	1 (3)	2 (5)	0 (0)	0 (0)

EBF: exclusive breastfeeding, EFF: exclusive formula feeding

Table IV: Factors associated with age when switching over to complementary feeding (n = 142)

Factor	≤ 6 weeks	7-12 weeks	≥ 13 weeks	Total	chi-square	p-value
	n (%)	n (%)	n (%)	n (%)		
Source of formula in the EFF group (n = 103)						
Father and or mother	16 (18)	34 (39)	38 (43)	88 (85)	1.31	0.520
Others	5 (33)	8 (53)	2 (13)	15 (15)		
Previous experience of the PMTCT of HIV counselling						
No	15 (65)	20 (44)	35 (47)	70 (49)	2.88	0.238
Yes	8 (35)	25 (56)	39 (53)	72 (51)		
No of individualised infant-feeding counselling sessions						
None	20 (22)	32 (35)	40 (44)	92 (65)	9.48	0.009*
≥ 1 session	3 (6)	13 (26)	34 (68)	50 (35)		
Number of living children in the family						
1-2	11 (16)	17 (24)	43 (61)	71 (50)	14.36	0.006*
3-4	7 (12)	23 (38)	30 (50)	60 (42)		
≥ 5	5 (46)	5 (46)	1 (9)	11 (8)		
Marital status						
Single or widowed	4 (57)	2 (29)	1 (14)	7 (5)	9.66	0.008*
Married	19 (14)	43 (32)	73 (54)	135 (95)		
Mothers' educational status						
Tertiary	0 (0)	6 (21)	23 (79)	29 (20)	8.79	0.044*
Secondary	13 (16)	29 (36)	39 (48)	81 (57)		
No formal or primary education	10 (31)	10 (31)	12 (38)	32 (23)		
Socio-economic class						
High	1 (6)	4 (22)	13 (72)	18 (13)	12.05	0.017*
Middle	7 (12)	15 (25)	37 (63)	59 (42)		
Low	15 (23)	26 (40)	24 (37)	65 (46)		
Fathers' educational status						
Tertiary	0 (0)	3 (20)	12 (80)	15 (11)	5.54	0.237
Secondary	10 (16)	23 (37)	29 (47)	62 (46)		
No formal or primary education	10 (17)	16 (28)	32 (55)	58 (43)		

EBF: exclusive breastfeeding, EFF: exclusive formula feeding, HIV: human immunodeficiency virus, PMTCT: prevention of mother-to-child transmission
* Statistically significant

infant's life were the inability to provide enough milk (97%, n = 92), and pressure from their family or neighbours (3%, n = 3). The reasons given by the nonadherent EBF mothers for not giving their infants breast milk exclusively for six months were fear of the MTCT of HIV with ongoing exposure of their infant to their breast milk (65%, n = 20), pressure to practise mixed feeding (10%, n = 3), a perception that their breast milk supply was inadequate (10%, n = 3), poor weight gain by the infant (7%, n = 2), breast problems (7%, n = 2) and advice given by health workers (3%, n = 1).

Factors associated with infant's age when switching over to complementary feeding

The mean age of switching their infants over to complementary food was 12.9 weeks [standard deviation (SD) 6.3]. At three months of age, almost half (48%, n = 68) of the infants in the sample were already receiving complementary food, as demonstrated in Table IV. Mothers who chose to exclusively formula feed were significantly more likely to switch over to complementary food at an earlier age (chi-square 10.92, p-value 0.012). Factors significantly associated with early complementary feeding included the type of prenatal infant-feeding counselling provided (i.e. individual versus group counselling), the mothers' marital status, the number of children in the family, and the mothers' socio-economic status and educational status. After logistic regression analysis was applied, only socio-economic class remained significantly associated with early complementary feeding (odds ratio of 2.96, p-value 0.042).

HIV status of the infants

One infant in the EFF group was HIV positive at six weeks, and another in the EBF group had seroconverted at six months, thus resulting in a total MTCT of HIV rate of 1% at six months. Both mothers whose infants tested positive to HIV admitted poor adherence with their ART. In addition, the HIV-positive infant in the EBF group was mixed fed.

Discussion

The choice of EFF by the majority of the mothers was comparable with what was reported from previous Nigerian studies conducted prior to the adoption by Nigeria's Federal Ministry of Health of the "rapid advice" guideline.[5,15,16]

The preference for formula feeding over breastfeeding by most mothers may be attributed to the very high rate of serostatus disclosure to their partners. Partners provide strong support against socio-cultural and family influences which may hinder the choice and practise of replacement feeding.[6] However, the high level of support given by fathers, despite a high serodiscordance rate of 43%, was surprising. The assessment of the fathers' HIV status was based on verbal reports provided by their wives, and this may not have revealed the true magnitude of serodiscordance. However, similar serodiscordant rates have been reported in previous African studies.[17,18]

The reasons provided for the choice of infant feeding are in agreement with the findings of other African studies.[6,15,19] HIV-positive mothers seem to be more concerned about the risk of the MTCT of HIV, the cost of replacement feeding and raising suspicion in others about their HIV-positive status and consequent stigmatisation, than the benefits of breastfeeding or the adverse consequences of replacement feeding. This implies that adherence to the current Nigerian national guideline, which promotes the breastfeeding option only for all HIV-infected mothers in the country, would be enhanced if counsellors clearly emphasised that ART prophylaxis with EBF during the first six months drastically reduces the risk of MTCT of HIV through breast milk, and thus addresses most of the concerns of HIV-infected mothers.

The inability of most mothers in the EFF group to sustain EFF with correctly prepared formula confirmed that the choice of replacement feeding was not appropriate for most of them. According to the WHO,[2,20] formula-feeding mothers must do so exclusively with correctly prepared and safe formula for the first six months of life. In this study, EFF with correctly reconstituted formula decreased from roughly half at two weeks to less than 10% at six months. The referral of defaulting mothers to trained counsellors for the reinforcement of counselling at each visit did not seem to affect this trend, and suggests that serious financial constraints were a factor. Most of the mothers switched over to homemade, nutrient-poor complementary food because they could not purchase enough formula to sustain EFF. It has been reported that the majority of families who give replacement feeds to their infants in developing countries resort to low-volume or diluted feeds in order to make the formula last longer.[3] This underuse of formula, with the associated risk of malnutrition, is a strong argument in favour of the adoption of the breastfeeding option by Nigeria's Federal Ministry of Health.

The early cessation of breastfeeding among EBF mothers was another concerning finding in this study. What was even more concerning is that mothers who decided to stop breastfeeding before their infant was six months of age switched over to homemade, nutrient-poor complementary food, rather than the recommended infant formula.[20] These findings are in agreement with those in previous reports and reflect that both exclusive breastfeeding and replacement feeding are difficult to implement in low-income settings where inappropriate infant-feeding practices, like early introduction of complementary food, herbal mixtures and water, are deeply engraved.[1,21-23] However, most mothers in the index study switched over to complementary feeding, rather than mixed feeding, and this suggests that they were well informed on the dangers of mixed feeding.

The benefit of EBF with ART prophylaxis in improving the HIV-free survival of HIV-exposed infants in resource-limited settings is well documented.[2,20] Despite the fact that the breastfeeding mothers were on combination ART, the majority of them were anxious about the risk of MTCT of HIV as a result of ongoing exposure of their infant to their breast milk. This was reported as the reason given for switching over to early complementary feeding. This reinforces the need for counsellors to deliver clear messages in which the benefits of ART prophylaxis in drastically reducing the MTCT of HIV through breast milk are clearly emphasised. The findings of this study support the recommendation that breastfeeding mothers should be taught proper breastfeeding techniques in order to avoid issues such as poor breast milk flow, poor weight gain (of the infant), or the breast milk not being "enough" for the infant, as these factors can influence many mothers to resort to early complementary feeding.

The rate and timing of complementary feed initiation in this study was similar to what has been reported in the general population with regard to infants aged ≤ 6 months in Nigeria.[3-5] The significant association between early complementary feeding, and not having at least one individualised counselling session, being single, having several children and poor socio-economic status or maternal educational status, was unsurprising. Women who are better educated are more likely to understand the implications of not adhering to the recommendations, and may have a greater ability to cope with socio-cultural challenges which mitigate against adherence to the recommendations. Individual counselling sessions are believed to avail mothers of the opportunity to have their individual circumstances assessed, and for solutions to be suggested in response to factors which may negatively influence adherence to the infant-feeding recommendations. However, it has been reported that individualised counselling may not be feasible for most HIV-infected mothers in Africa.[3]

The single feeding option that was adopted by the country's Federal Ministry of Health[13] is also favoured, owing to the nonfeasibility of individualised infant-feeding counselling sessions for all HIV-infected mothers in Nigeria. This is because the time spent on counselling individual mothers on different options, allowing them make an informed choice, determining if the choice is best for their individual circumstances, and training them on their choice, will be channelled into conveying the national recommendation, as well as training them adequately on breastfeeding techniques. Breastfeeding mothers should be adequately counselled against nonadherence to ART prophylaxis or mixed feeding to prevent the MTCT of HIV, as experienced in the index study.

Mothers who practised mixed feeding did so within five weeks of delivery, and this is the period during which many visitors are expected in the home. Thus, HIV-infected mothers are under scrutiny by friends and family members, and are most prone to being suspected of having a positive HIV status if not breastfeeding, and

most prone to pressure to practice mixed feeding during this period. This implies that adequate provision should be made in PMTCT of HIV programmes to reinforce counselling and support HIV-infected mothers during this period. The aggressive promotion of EBF for all women, irrespective of their HIV status, would help to reduce the pressure on mothers to practise mixed feeding, thereby enhancing adherence by HIV-infected mothers to EBF.

Study limitations

The limitations of this study need to be acknowledged. The samples were drawn from one centre which provides PMTCT of HIV services. This limits extrapolation of the findings to the general population of HIV-infected mothers. Nevertheless, this study provided important information that will assist in ensuring adherence by HIV-infected mothers in Nigeria to the recommended infant-feeding guidelines.

Conclusion

Adherence to either EBF or EFF was low in this study owing to the early cessation of breastfeeding and the inability to sustain EFF, respectively. Financial constraints were a major barrier to EFF, while adherence to EBF was seriously influenced by the fear of the MTCT of HIV. There is need for full integration of the Nigerian national infant-feeding guidelines into PMTCT of HIV programmes. HIV-infected mothers should be provided with adequate counselling and support on breastfeeding. Clear messages on the benefits of ART prophylaxis in reducing the MTCT of HIV through breast milk, as well as the risks of early complementary feeding, mixed feeding and nonadherence to ART prophylaxis, are essential during counselling sessions.

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