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BRIEF REPORT

Experience and Outcomes of Breastfed Infants of Women Living With HIV in the United States: Findings From a Single-Center Breastfeeding Support Initiative

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We assessed breastfeeding outcomes for a cohort of infants born to women living with HIV (WLHIV) at an urban health care center in the United States. Ten infants were exclusively breastfed for a mean duration of 4.4 (1.0-8.6) months. All had negative HIV RNA PCRs at a median age of 16 months.

Key words. breastfeeding; HIV; infant; outcomes; United States; women living with HIV.

Guidelines by the American Academy of Pediatrics and the Centers for Disease Control and Prevention strongly recommend that women living with HIV (WLHIV) not breastfeed their infants irrespective of viral load (VL) levels or treatment adherence, with a recent caveat that "permits breastfeeding with adequate support" [1, 2]. This recommendation is in stark contrast to the World Health Organization's guidelines for resource-limited settings that endorse exclusive breastfeeding for the first 6 months of life for WLHIV [3]. The recommendation is based on evidence from African countries which showed lower mortality and significant reduction in HIV transmission to babies who were exclusively breastfed from birth until 6 months of age [4, 5]. In high-income countries (HIC) where the risk of mortality from gastrointestinal and respiratory disease is very low, malnutrition is rare, and the residual risk of HIV transmission assumes much greater importance, formula feeding is recommended [6].

Although studies evaluating Undetectable=Untransmittable in the setting of breastfeeding are yet to be conducted and outcomes are yet unknown [7], experiences of women in low- and middle-income countries (LMIC) and emerging data from HIC show that the risk of HIV transmission through breastfeeding is low in the setting of strict adherence to antiretroviral therapy (ART) and undetectable viremia [8]. In contrast, data on breastfeeding with HIV are limited in HIC. A recent case series from Canada reported on 3 infants born to 2 virologically suppressed WLHIV who breastfed without mother to child transmission [9], but no data exist on breastfeeding practices and outcomes in WLHIV and their babies within the United States.

Following an update to the US perinatal guidelines which provided language "permissive" of breastfeeding in 2018 [2], clinicians from multiple specialties within our institution assembled and developed an approach to support women who chose to breastfeed. We aim to report the infant outcomes of this program to contribute to the evidence for strategies that support and improve the process and outcomes for WLHIV who choose to breastfeed their infants.

METHODS

The objective of this program evaluation was to assess the infant outcomes of exclusive breastfeeding among 9 mothers living with HIV who self-selected to breastfeed their 10 infants in an urban health care center within the United States. In response to rising breastfeeding desires by WLHIV receiving HIV care from our center, the multidisciplinary breastfeeding support program was created to assist women who fit certain pre-established criteria (adherence to ART and care, sustained virologic suppression) through the process. Interested women meeting the criteria were counseled on the risk of HIV transmission and completed a waiver acknowledging and accepting the risk of breastfeeding. During the course of pregnancy, comprehensive antenatal care (ANC) was provided. Maternal VLs, CD4 count, and adherence to antiretroviral treatment were closely monitored.

Following delivery, infants were initiated on triple ART (zidovudine [AZT], lamivudine [3TC], and nevirapine [NVP]) in

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the newborn nursery and seen by a pediatric infectious disease specialist, neonatologist, pediatric nurse practitioners, and lactation consultant. Initial virologic testing (HIV DNA and RNA PCR) and complete blood counts and chemistries were obtained on all infants. The infants received routine newborn care and were discharged home once clinically stable and breastfeeding well. After discharge, infants were followed in the pediatric HIV clinic, and seen monthly with their mothers to assess adherence to exclusive breastfeeding and ART, provide HIV PCR testing for mother and infant, support for breastfeeding, and guidance for weaning. Infant HIV RNA was measured using standard real-time PCR clinical assays from the time of birth and at specified intervals during and after breastfeeding (birth, 2 weeks, 4 weeks, 8 weeks, 16 weeks, 24 weeks, 4 weeks post-cessation of NVP, monthly until cessation of breastfeeding, 4- to 8-week post-cessation of breastfeeding, 18 months).

Maternal data include HIV history, diagnosis, comorbidities and pregnancy complications, ART, VL, CD4 during and after pregnancy, disclosure, reason for breastfeeding, maternal demographics, breastfeeding duration, and infant outcomes. Infant data include gestational age at delivery, HIV testing, ART, and breastfeeding duration. This program evaluation was approved by the Johns Hopkins Institutional review board.

The number of women included represent the total number of pregnancies. Statistical analysis was performed using STATA software (Stata Statistical Software, Release 16, StataCorp LLC, College Station, TX, USA).

RESULTS

Over a 30-month period, 14 women with 15 pregnancies (including 1 woman with 2 pregnancies) and 16 infants (15 singleton, 1 twin delivery) expressed interest in breastfeeding. At the time of data collection, 1 mother had undergone counseling but had not yet delivered; she decided against breastfeeding. Of the 16 infants born to the 14 women, 10 (62.5%) were breastfed. Data from mothers (N = 9), with 10 pregnancies and their breastfed infants (n = 10) are presented here. Of the reasons given for choosing to breastfeed, 6 (60%) cited concerns for infant health, 5 (50%) disclosure concerns, 2 (20%) cultural expectations, and 1 (10%) religious beliefs. All of the breastfeeding mothers were of African descent, and 8 (80%) were non-native immigrants from LMIC in Africa. Forty percent of women had previously delivered and nursed infants while living with HIV. The mothers were all registered for ANC at a mean gestational age of 18.4 weeks (SD, 1.3). Table 1 shows baseline maternal characteristics. All mothers were on triple ART regimen at the time of conception; 70% were virally suppressed at the first antenatal visit. At the first antenatal visit, the median VL was 20 copies/mL (IQR 20-174), and mean CD4 count was 663 cells/mm^3 (SD 179.1). Of the mothers whose VLs were greater than 20 copies/mL at the first antenatal visit (N = 3), HIV VL progressively declined during follow-up, reaching a nadir of <20 copies/mL for all but 1 patient at delivery (1 woman had VL = 24 copies/mL). All mothers reported adherence to ART and were compliant with antenatal visits. Eight of the 10 pregnancies were delivered at term, while 2 were delivered at <37.0-week gestation (range 34.0-41.0 weeks). The mean gestational age at delivery was 38.4 weeks (SD 2.2). Half of the infants (n = 5) were delivered by spontaneous vaginal delivery while the other half were by cesarean sections. Postpartum maternal HIV VLs have remained undetectable.

The mean birth weight was 6.6 pounds (3.1 kg). Mothers received instructions on safe breastfeeding and lactation

Table 1. Baseline Maternal Characteristics and Demographics

Maternal Characteristics	N = 10[a]
Age at delivery, median (IQR)	33.5 (29-39)
Race (%)	
Non-native African American	80
Native African American	20
History of breastfeeding with HIV (%)	40
Mean GA at delivery, mean (SD)	38.4 (2.2)
Preconception ART (%)	100
Viral load at first ANC, median (IQR)	20 (20-174)
CD4 at first ANC, mean (SD)	663 (179.1)
Length of ANC in weeks, median (IQR)	24.4 (7.7-29.4)
Mode of delivery (%)	
Vaginal	50
Cesarean section	50
Viral load at delivery, median (IQR)	20 (20-20)
Intrapartum ART (%)	50

Abbreviations: ANC, antenatal care; ART, antiretroviral therapy; GA, gestational age; IQR, interquartile range.
[a]One woman with 2 pregnancies is included twice.

Table 2. Baseline Infant Characteristics and Demographics

Infant Characteristics	n = 10
Sex (%)	
Female	50
Birthweight, mean (SD)	3.1 (0.5)
Birth HIV PCR (%)	
Negative	100
HIV viral load at birth (%)	
Undetected	100
Commenced ART at birth (%)	100
Duration of breastfeeding in months, median (IQR)	4.4 (1.0-8.5)
Timeline of negative HIV RNA PCR (N)[a]	
2 weeks	10/10
4 weeks	9/9
8 weeks	8/8
16 weeks	9/9
24 weeks	8/8
2- to 4-week post-cessation of breastfeeding	9/9

Abbreviations: ART, antiretroviral therapy; IQR, interquartile range; PCR, polymerase chain reaction.
[a]Of infants who were tested at that timepoint.

techniques at the time of birth. All infants were commenced on triple regimen (AZT/3TC/NVP) for a duration of 4-6 weeks, followed by NVP alone continued through 6 weeks after discontinuation of breastfeeding. All infants have completed breastfeeding. The median duration of breastfeeding was 4.4 months (IQR 1.0-8.6). Viral RNA PCR at 2, 4, 8, 16, 24 weeks and 18 months remain negative for infants who have attained the specified age (see Table 2).

DISCUSSION

In this evaluation of a single-center breastfeeding program for WLHIV, 9 women with HIV viral suppression breastfed their 10 infants without HIV transmission. To our knowledge, this is the first US-based report describing the breastfeeding experience and outcomes of WLHIV. The cohort evaluated here represents a unique subgroup of WLHIV within the United States whose lived experiences with HIV may have played a role in the choice of infant feeding. The majority of women in this program were women from LMIC in Africa. Similar demographics are observed from studies on infant feeding conducted in HICs among WLHIV. Specifically, breastfeeding desires were highest among African and Afro-Caribbean migrants [10, 11].

Virologic suppression was achieved prior to conception or delivery for all women in this study, and all infants have remained HIV-negative. A recent systematic review and meta-analysis of 6 studies on postnatal transmission through breastmilk reported an estimated risk of 1.08% (95% CI 0.32%-1.82%) at 6 months [12] lower than previously reported by older studies. Importantly, a subset of these infections occurred in the context of mixed feeding, late initiation of maternal ART, and poor virologic control [12]. The estimated risk may be even lower for WLHIV in HIC with improved access to HIV care. Our findings support these and other current evidence that the transmission of HIV in optimal scenarios (suppressed VL, elevated CD4 counts, adherence to ART, regular follow-up, and infant prophylaxis) is uncommon [13, 14].

Given the evidence, the recent changes in perinatal guidelines in the United States may be a step in the right direction. Women seeking to breastfeed due to personal preferences, disclosure concerns, and other sociocultural factors should receive adequate, non-judgmental support to ensure a safe and successful breastfeeding experience for both mother and child.

Infants in this program received a triple ART regimen (AZT/3TC/NVP) for 4-6 weeks followed by NVP monotherapy through 6-week post-cessation of breastfeeding. This regimen was chosen over NVP monotherapy due to its demonstrated safety and efficacy in HIV-exposed uninfected and infected neonates, and its enhanced prophylaxis to cover for the potential added risk of HIV exposure through breastmilk [12, 15].

Our findings must be considered in light of certain limitations. First, breastmilk viral RNA was not measured as part of the evaluation of HIV risk in these WLHIV, however, such testing is not clinically available. While serum VL levels and CD4 counts are utilized as predictors of virologic control, we recognize that measuring viral RNA and HIV-1 DNA load of breastmilk could be the most optimum and future evaluations may consider incorporating these parameters in its assessment. It is noteworthy that the risk of HIV transmission with breastfeeding may be low but not eliminated, particularly if there are interruptions in ART or other factors (eg, mastitis). In addition, the sample size in this report is too small to conclude that breastfeeding is not associated with any transmission risk. Hence, this change in philosophy and process should be monitored rigorously to ensure harm reduction and successful breastfeeding experiences for WLHIV who choose this means of infant nutrition. Studies to better understand the role of U=U in breastfeeding, the best virologic measure of risk in breastfed infants, and optimal ART prophylaxis for infants exposed to breastmilk are warranted. Finally, the WLHIV who chose to breastfeed are a motivated, self-selecting group and the outcomes may not be generalizable to all WLHIV.

In conclusion, the existence of this program and the number of women and infants identified here speak to the need to bridge the gaps between current local and global guidelines using clinical evidence, and the development of specific guidelines for strategies to support WLHIV who choose to breastfeed.

Notes

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