Breastfeeding for HIV-infected women

Professor Ruth Nduati gives a bird's view of the benefits of breast feeding and its significance for HIV infected women

One of the most important medical advances of the 21st Century is the recognition that every mother and child no matter their location or circumstance benefits from optimal breastfeeding practices. This is a key departure from when breastfeeding was largely promoted as medicine for the poor.[1] The best practice in infant feeding is as follows.

- Breastfeeding should be initiated within the first hour of life;
- Babies should be exclusively breastfed (EBF) for the first six months of life followed by;
- Continued breastfeeding for up to two years of age and beyond with appropriate introduction of complementary foods at six months;
- Babies should be breastfed on demand as often as the baby wants both day and night.

Breastfeeding improves child health, and protects mothers against ovarian and breast cancer. Breastfeeding protects against pneumonia and diarrhoea, the two leading causes of child death and has even greater protection against hospital admission. Breastfed babies have reduced risk of sudden infant death and a >50% incidence of necrotising enterocolitis an often fatal new born condition compared to non-breastfed babies. It is estimated that exclusive breastfeeding would prevent up to 87% of deaths in the first 6 months of life and any breastfeeding in the period 6-23 months of life is associated with 50% reduction in deaths.[1,2]

Across all social economic states, breastfeeding is associated with higher performance on intelligence tests in children and adolescents translating into improved academic performance and long-term economic earnings and productivity, making breastfeeding one of the most critical and far reaching investment into a nation's human capital.[2] There is a general understanding that achieving universal coverage with appropriate breastfeeding exclusive breast feeding for the first six months and continued breastfeeding with complementary feeding until 24 months of life is crucial to achievement of the structural development goals.

Three broad areas of intervention have been identified: (a) enabled health systems and services and especially compliance with baby-friendly hospital initiative (BFHI); (b) Family and community; and (c) maternity protection and the workplace.[1] Legislation in addition to advocacy and health education are important tools for protecting and promoting breastfeeding.

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Global guidance

Infant feeding guidelines emerged soon after the first cases of breastmilk transmission of HIV were described and two opposing positions were adopted. The 1985 CDC guidelines were weighted towards preventing mother-to-child transmission of HIV and therefore despite very preliminary information recommended that that infants of HIV-infected mothers should not be breastfed.[3] The WHO consultation, on the other hand, recommended balancing the risk between HIV acquisition and the loss of protection against infections, especially where infections are the commonest causes of death, and in doing so to some extent discounted the seriousness of the emerging epidemic of paediatric HIV.[4] These two different positions continue to set the stage for research studies to characterise mother-to-child transmission of HIV, the magnitude, timing and risk factors pre- and post- introduction of anti-retroviral drugs.

Striking a balance

Current guidelines reflect the same opposite approaches; the 1985 CDC guidelines remains in place, reiterated in 2020 and is the practice in many countries in Europe, America and Asia.[5] WHO 2010 guidelines update in 2016 and confirmed in 2019 have defined the primary goal to be HIV free survival.[1,6] The goal is to support the strategy with the highest likelihood of HIV free survival (HVS) of exposed babies and not harm the health of the mother.

"The WHO guideline states that where diarrhoea, pneumonia and malnutrition are leading cause of death national authorities should support mothers living with HIV whose infants are either uninfected, or unknown status to exclusively breastfeed their babies for the first 6 months and then continue to breastfeeding with complementary foods through 24 months while providing their mothers ARV.

The recommendation is premised on a functional national HIV programme that provides an integrated HIV-maternal new-born health service. A further requirement is to inform HIV infected women of alternatives to breastfeeding and that governments or individuals to make a decision on what is the optimal approach to achieve HVS, a recommendation that is a challenge to implement in a nationwide programme. The region of sub-Sahara Africa and especially in the East and Southern Africa region continues to struggle with the double burden of high HIV prevalence among women of child bearing years as

well as high levels of childhood malnutrition and infectious disease morbidity and mortality which would be further aggravated by replacement feeding. In 2019, over 50% of the global under-five deaths were in sub-Sahara Africa.[7] HIV exposed infected (HEI) and uninfected (HEU) children are especially vulnerable because one of the first line of defence, maternal protection through passive transfer of maternal antibodies is sub-optimal.[8,9]

HIV-related challenges to EBF

Early observations that exclusive breastfeeding (EBF) being associated with lower risk of breastmilk transmission of HIV resulted in aggressive promotion of the same. Breastfeeding is not a private event specially when the gold-standard approach is on-demand feeding. An unintended outcome of this promotion is that at community level EBF is viewed as an indicator of being HIV-infected.[10] HIV infected women, frightened by the possibility of transmitting HIV to their baby would follow the advice, equally scared of the risks and costs associated with replacement feeding. Women who were negative or unknown status would be frightened of being perceived as HIV positive, a highly stigmatised condition and so would in public adopt the less safe option of mixed feeding.[10]

Breast milk is a nourishing body fluid from the mother, she needs to be well to do this and in the context of HIV, she need to have sustained viral suppression to safely feed her baby and anything less than that means the baby receives a nourishment on one hand but has an ongoing exposure to HIV infection. The use of combination ARV to achieve maternal viral suppression diminishes breastmilk viraemia and risk of infant infection.[11]

A public health approach that promotes one policy reduces confusion and increases the likelihood of success and benefit to the majority. This approach should not diminish the seriousness and long-term repercussions of mother-to-child transmission of HIV. Many nations in our region have adopted a policy of breastfeeding for all children.[1] Pregnant women and mothers living with HIV should be informed on the infant feeding practices recommended by the national or subnational governments to improve the HIV-free survival of their infants and the health of mothers living with HIV.[1]

Protecting the baby from HIV infection is part of the continuum of care starting with the pre-pregnancy period, pregnancy, delivery and through post-delivery period until the baby is fully weaned off the breast. HIV prevention programmes are heavily dependent on donor funding, and the delivery is labour intensive posing a continuing challenge to long-term sustainability. In the real world, prevention is frequently undermined all too often by the persistence of the different scenarios highlighted in figure 2. titled, “closing the gap on HIV-free survival of the breastfeeding HIV exposed child”. The rest of this article reviews infant outcome in the situations when we do nothing, either because the system is failing to provide prevention of mother-to-child of HIV services, or because women are opting out; the results of sub-optimal intervention and what is possible with the existing technology.[12]

Risk of breastmilk transmission of HIV

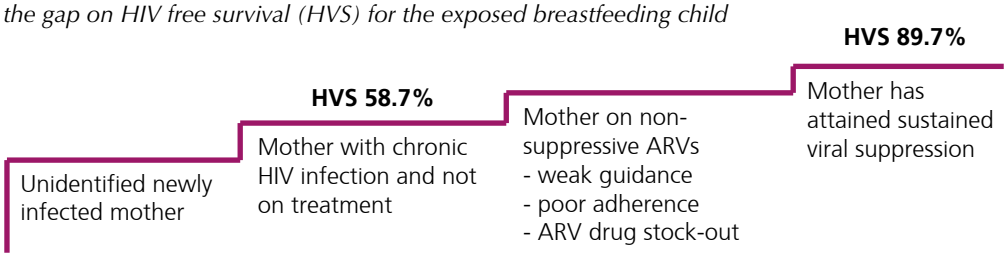
(1) Undiagnosed newly infected during pregnancy and postnatally during breastfeeding. Adolescents and young women of child bearing age continue to be fastest growing population of new HIV infections and coupled with this is high rate of HIV discordancy among couples and lack of knowledge of partner’s HIV infection status.[13] In East and Southern Africa up to 40% of HIV infected pregnant or breastfeeding women in care are newly diagnosed and therefore have not benefited from pre-conceptual HIV care. A meta-analysis from 19 African cohorts representing 22,803 total person-years, found that pooled HIV incidence rate during pregnancy/postpartum was 3.8/100 person-years (95% CI 3.0–4.6):4.7/100 person-years during pregnancy and 2.9/100 person-years postpartum (p = 0.18).[14] These new infections pose a significant risk for transmission to the infant. A Zimbabwean study found that among women seroconverting in the 0-9 months and 10-12 months post delivery period, the rate of breast milk transmission was 34.56 (26.6-44.91), and 9.5 (3.07-29.4) per 100 child years respectively contrasting with the risk of 8.9 per 100 child years in women with established infections. The risk was exceptionally high at 75% among newly HIV infected women who had not yet developed any antibodies and only identified as positive by virologic testing using PCR.[15]

(2) Chronically HIV-infected women of child bearing age who have not accessed ARVs. Data from the Nairobi infant feeding study conducted before availability of ART randomised 425 HIV infected to either breastfeeding or formula and followed up until their infants were two years is illustrative of this scenario. Compliance to assigned feeding modality was 96% in the breastfeeding arm and 70% in the formula arm.[16] The median duration of breastfeeding was 17 months, and outcome HIV infection or death was achieved for 94% of the study participants. Briefly the key findings from this study are as follows. More than one in three breastfed children acquired HIV infection and transmission continued throughout the exposure period.

Cumulative risk of infant infection at 24 months was 36.7% (95% CI 29.4%-44.0%) in the breastfeeding arm and 20.5% (95% CI 14.0%-27.0%) in the formula arm, p=0.001.16 The absolute risk of breast milk transmission of HIV was 16.2% (95% CI 6.5-25.9%), and accounting for 44% of the overall infections, a figure confirmed by a meta-analysis based on other studies.[16,17] Most breastmilk transmission occurred early, with 75% of the risk difference between the two arms of the study occurring by six months.[16] The two years cumulative mortality of the children was 24.4% (95CI 18.2%-30.7%) in the breastfeeding arm versus 20.0% (95CI 14.4%-25,6%) in the formula arm, p=0.30].16,18 The HIV-free survival in the breastfeeding and formula arm was 58.0% and 70.0% respectively p=0.02.16 Equal risk of death and HVS of breastfed and formula fed infants has been described in ARV exposed infants in published studies from Botswana and Rwanda and has justified the offer of replacement feeding as preferred option for HIV exposed infants in those nations.[19,20]

The HEI in this study had a 9-fold increased risk of

Figure 1. Closing the gap on HIV free survival (HVS) for the exposed breastfeeding child



death (95% CI 5.3-15.3), compared to the HEU. The incidence of diarrhoea and pneumonia were identical in the two arms of the study.18 Independent of HIV infection status there was an 8-fold increased risk of infant death after mother's death -relative risk 7.9 (95% CI 3.3-18.6%, p < 0.001.21 This phenomena has been described in HIV unexposed infants.22 A unexpected finding was a higher mortality in breastfeeding mothers. The cumulative probability of death at 24 months was 10.5% in the breastfeeding group and 3.8% in the formular arm, a relative risk of 3.2 (95% CI 1.3-8.1, p=0.01] and in a stratified analysis, even higher risk among women with advanced disease.[21] Other research shows chronic immune activation and high viral load in untreated HIV infected women interferes with in-utero passive transfer of antibodies to infants further increasing vulnerability of both HEU and HEI children to common infections.[9]

(3) Mother is on non-suppressive ART. Once it was demonstrated that 80% of transmission and deaths were among women with advanced HIV, they were quickly identified as the priority group for ART treatment, together with infant prophylaxis. Research has quickly moved and now the goal is for maximal viral suppression for all HIV infected individuals, treatment as prevention, best for individuals' health and proffers lowest risk of transmitting to other. Broadly there are two key contributors to the lack of maternal viral suppression.

Failure to adhere to the ARV treatment or completely abandoning the treatment. When ARVs are abandoned the viral loads bounce back to where they were or even higher and at this point there is high risk of infection to the baby. Infant ARV prophylaxis partly mitigates this situation and use of AZT and single dose nevirapine has been a key intervention in prevention. Infants who are infected when the mother is on ART and not supressed have increased likelihood of infection with resistant virus. To address this gap there is need for consistent client friendly support for adherence.[23,24]

Sub-optimal or poorly implemented national guideline - As new evidence emerged on optimal ARV regimens and best practice for feeding the HIV exposed infant, there have been many changes in the global guidelines. National guidelines and their implementation have not always matched this progress exposing to mother-infant dyads to suboptimal regimens. The first generation of studies using anti-retroviral drugs to prevent MTCT of HIV quickly demonstrated that HVS of the breastfed infant was similar to the formular fed infant, however the breastfed baby had more HIV infections compared to the formular fed one, while the latter had increased risk of infectious disease morbidity because they were not breastfed. At this point women were advised to make an informed choice. Next was the phase of advising early weaning to prevent late breastmilk transmission but very soon data emerged on the adverse effect of shortened breastfeeding even when you have prevented infant HIV infection. There has been an exploration of infant ARV prophylaxis for increasing durations during breastfeeding and an important lesson was that prophylaxis worked as long as the drugs were given to the baby. Infant ART prophylaxis is not like a savings account that is available for the future rainy day when they are exposed and not on prophylaxis. Our healthcare systems are still implementing some of these outdated interventions as the standard or because health-workers are poorly informed on current practice standards.[23]

(4) HIV infected mothers have sustained viral suppression. The important breakthrough has been the use of combination ARV's for treatment and prevention with the goal of universal coverage including pregnant and breastfeeding women, and achieving viral suppression.[11]

The value of viral suppression for the HIV infected breastfeeding women encompasses:

- Assurance that they will survive and be able to feed and care for their infant without transmitting infection.
- Breastmilk has diminished/undetectable viral load practically eliminating risk of HIV transmission through breastmilk.
- The baby can benefit from augmented HVS achieved by breastfeeding to 2 years.[6,26]
- Added cost of providing for safe replacement feeding is eliminated.
- HIV-infected women are highly motivated to adhere to breastfeeding guidelines without fear.
- Immune reconstitution following use of maximally supressing ART treatment means that not only is the woman less prone to infections, she is also able to give improved passive immunity to their infant, a critical component of protection against infections in the early new-born period.[8,25]
- When a mother has sustained viral suppression there is an option of simplifying infant care by withholding infant ART and co-trimoxazole prophylaxis during breastfeeding without harming the baby, with potential for substantive savings for national programmes.[27]

A universal approach to an integrated HIV-Maternal-New-born-Child Health package is a necessary strategy for optimal outcomes in breastfeeding for HIV infected mothers. Figure 3 highlights the work that needs to be done to support safe breastfeeding for in a population

Figure 2. Integrated HIV-Maternal newborn-child health package to support breastfeeding

	Point of care action	Facility / health systems preparedness
Before conception	- Known status for self and partner - Optimise HIV viral suppression through use of appropriate ART - Health education on self-care during pregnancy and breastfeeding	- Popularise pre-conception care - Couple counseling and testing - Combine ART with pre-exposure prophylaxis
Pregnancy	- Repeatedly offer HIV testing to pregnant negative women or those with unknown status and their partners at every contact - Optimise viral suppression in known HIV-positive women - Essential pregnancy and postnatal care package for all women including education on breastfeeding (how to do it and how to sustain it) - Deliberate support of HIV-infected women to stay in care	- Scale up ANC services - Individual and couple counselling at every ANC - Ensure adequate numbers of skilled staff - Ensure adequate commodities - Strengthen mother-to-mother breastfeeding support groups
Delivery	- Repeat HIV testing for negative women or those with unknown status, preferably as couple testing and counselling - Ensure ART for the mother and prophylaxis for the baby within 72 hours of delivery for latter and instructions to mother on administration - Initiated breastfeeding within the first hour of life and encourage exclusive breastfeeding to 6 months - Give baby first vaccine shots and work towards minimising missed opportunities with the understanding HIV-exposed infants have heightened vulnerability to common childhood infections - Support mothers to space births and provide commodities as needed, including counselling on EBF to achieve lactation amenorrhoea – this allows current baby opportunity for requisite breastfeeding time	Birthing facilities: - Skilled health worker - Delivery - Skills on helping baby breathe and handling obstetric emergencies Lactation management - Support for ART adherence - HIV testing and counselling - Medicial clerkship, diagnosis and prescription Commodities - HIV testing commodities - Delivery commodities - ARVs - Vaccines and cold chain - Family planning commodities
Postnatal period - birth to 6 months	- Continued breastfeeding support at facility and in the community for all mother-baby pairs and not to present EBF as an intervention for HIV-exposed infants only	- Lactation support for EBF - Maternity leave - Support in the workplace - Continued public education - Community health workers support breastfeeding
	- Timely immunisation for the baby to provide protection against common childhood infections	- Functioning cold-chain - Steady supply of commodities - Guidelines - Skilled health workers to deliver vaccine - Support supervision to diminish missed opportunities - Community support for immunisation
	- Early infant diagnosis followed by enhanced support for breastfeeding since a negative infant PCR id often a trigger for weaning - Timely initiation of ART if the baby is infected and support for continued breastfeeding	- EID commodities - Skilled counsellor to support breastfeeding and ARV adherence
	- Child spacing advice to the mother, screening for co-morbidities such as depression and intimate partner violence, factors that impeded successful breastfeeding and ART adherence	- Skilled health worker - Checklist as reminders - Link to existing support such as government cash transfers for indigent people
	- Ongoing health education to mother and community on child development, role of stimulation and parent-child bonding	- Mother-to-mother and other support groups - Continued medical education to build capacities and minimise misinformation and myths
Post-six-months	- Support for continued breastfeeding as complementary feeds are added to the diet, encourage kitchen gardens	- Skilled health worker and health education on complementary feeding

that continues to have a generalised AIDS epidemic, as is the case in sub-Sahara Africa.

We need to set ambitious targets

Every effort should be made to accelerate access to ART for maternal health and prevention. The HIV programme has identified 90% as a goal and hence the 90-90-90 target. If we follow this principal, that we only reach 90% of women with antenatal care, 90% of those who show up with testing the same for ART and viral suppression, we will only have accessed 65.6% of HIV exposed infants with optimal care package and at that rate MTCT will continue at an estimated steady rate of 10% far from the goal of 50 /100,000 live birth.22

Our programmes need to be sensitive to the hierarchy of needs. Food is a primary level need. When ARV drugs are not immediately available, breastfeeding may still provide exposed infants greater chance of survival and therefore national authorities should not be deterred from recommending that mothers living with HIV breastfeed as the most appropriate infant feeding in their setting as they scale up ART programmes. In emergency situations where ARV drugs are unlikely to be available such as acute emergencies breastfeeding of HIV exposed is recommended to increase survival. Let us strive to promote and protect safe breastfeeding for the HIV

exposed infant so that exclusive breastfeeding in the first 6 months and continued breastfeeding with complementary feeding until 24 months is a deliberate choice and not a default because of the attendant poverty.

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