

# Predictors of Exclusive Breast Feeding among HIV-Positive Mothers in North Rift Region of Western Kenya

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## Abstract

**Background:** After birth, infants infected with human Immunodeficiency virus or not are always at risk if exclusive breast feeding (EBF) is not practice since mother's milk is the ultimate nutrition for infant's survival, growth and development. Also, EBF of infant for the first six months can reduce the morbidity and mortality of children especially in developing counties where poverty is high. In regions where HIV prevalence is on the increase, especially in sub-Saharan Africa, EBF has the potential of reducing the risk of mother-to-child transmission (MTCT) of HIV. According to World Health Organization (WHO), EBF levels are low in third world than the stated figure of 90% despite major resources being set aside for PMTCT counseling to increase the prevalence of EBF. However, in Kenya for example, the area with the most acknowledged comprehensive care clinics (CCCs) is the North Rift with approximately 35% prevalence of exclusive breastfeeding. The present study highlighted the predictors of exclusive breast feeding among HIV-positive mothers in Kenya. **Methods:** A descriptive cross-sectional study design was used on a sample of 297 HIV-positive mothers attending the five CCCs. The subjects were randomly selected proportionally in all the five health facilities. Socio-demographic, cultural and economic data was collected using a structured questionnaire. In addition, qualitative and quantitative data in form of Focus group discussions (FGDs) was conducted among the mothers who were selected purposively and the data analysed by summarizing and categorizing of verbalise response of participants and highlighting emerging themes. Also, the information generated was analysed using bivariate and multivariate regressions. **Results:** Prevalence of EBF was 63% confirming disparity with the recommended 90% prevalence. The main predictors of EBF were: OR (95% CI): education level 17.67 (0.906, 2.512); knowledge 17.85 (3.806, 8.372); stigma 0.19 (0.092, 0.394); traditional beliefs 0.03 (0.007, 0.154). Improving knowledge on breastfeeding can contribute to enhancing the prevalence of EBF in Kenya to achieve the WHO recommendation.

**Keywords:** Exclusive breast feeding; HIV positive mothers; Knowledge; Stigma

## Introduction

Globally, over 10 million children worldwide under the age of five years die yearly, with approximately 41% of the deaths occurring mainly in sub-Saharan Africa (SSA) while 34% in South Asia. <sup>[1]</sup> Sub-Saharan Africa continues to suffer more with 15 times higher than an average high-income country. <sup>[2]</sup> Of the 10 million under-five deaths worldwide, approximately 4 million are newborns with the majority from developing countries. <sup>[3]</sup> Some of the main contributing factors to the deaths of this magnitude include inadequate breastfeeding practice

with high poverty especially in developing countries. <sup>[4]</sup> In view of the above, World Health Organization (WHO) recommended the need for the communities to practice of exclusive breastfeeding (EBF) for the first 6 months of life <sup>[5]</sup> to reduce the burden of morbidity and mortality of infants and young children. This practice when intensified has shown to be one

the leading and evidence based in child survival <sup>[1,5,6]</sup> as it has a protective effect against unnecessary deaths. <sup>[7]</sup>

Exclusive breastfeeding (EBF), is defined as giving an infant only breast milk (including milk expressed or from a wet nurse) from birth up to 6 months of age, without giving other liquids or solids, not even water, with the exception of Oral Rehydration Solution (ORS), or drops/syrups of vitamins, minerals or medicines. <sup>[1]</sup> Breast milk consist of ideal nutrients such as fat, sugar, water and protein that is required for the infant's growth

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development. Therefor advocating for promotion of EBF practice has significant impact on child survival and mortality.<sup>[8]</sup> In addition, for the wellbeing of both infants and mothers<sup>[9]</sup> EBF is beneficial to the health of the child in early childhood including long term benefits.

Breast milk as a source of nutrition is critical to protect newborns and infants against many illnesses and infectious diseases, including reducing the risk of diarrhea,<sup>[9,10]</sup> lowering risk of gastrointestinal infections and respiratory infections such as pneumonia, meningitis, neonatal sepsis, otitis media and allergies, better visual acuity, speech and cognitive development.<sup>[11-15]</sup> EBF can also protect the child from atopic eczema, the risk of allergy and asthma, leukaemia and decreases the risk of chronic diseases later in life such as obesity and type II diabetes.<sup>[16]</sup>

In sub-Saharan Africa, concerns about satisfying infants' nutritional needs, encouragement by other family members as a cultural norm and fear that feeding the baby only with breast milk could raise suspicion in the community about their HIV status. These are among reasons given by women infected with HIV for not exclusively breastfeeding their infants.<sup>[17]</sup> Supplemental feeding is traditionally common in many regions of the developing world, making it easy for women to practice mixed feeding.<sup>[18]</sup> Mothers who were HIV-positive introduced other foods in addition to breastfeeding to avoid stigmatization by their families and communities, making it difficult for them to practice exclusive breastfeeding.<sup>[19]</sup>

In Kenya, women deviate from the counselling received in the PMTCT clinic on exclusive breastfeeding for up to six months during which many infants are at great risk of MTCT of HIV through breastfeeding.<sup>[20,21]</sup> Based on literature, varied socio-demographic, cultural and economic factors influence whether a mother will exclusively breastfeed as well as duration of breastfeeding. This suggests that socio-demographic, cultural and economic factors that influence exclusive breastfeeding are context dependent and therefore should be explored in each given situation. Clear determination of these factors in the North Rift is therefore necessary as they should be documented since they are not static.

Due to the importance of EBF, several strategies have been initiated by UNICEF and WHO to promote optimal breastfeeding practices that recommends the commencement of breastfeeding immediately within 1 hour of birth.<sup>[20,21]</sup> For the maximum benefit of the child, there is need for exclusive breast feeding for first 6 months of infant life and thereafter, introduce suitable weaning foods while continuing to breastfeed for 2 years.<sup>[20,21]</sup> Accordingly, the Kenya government through the Ministry of Health implemented and endorsed these global Commitments to improve EBF practices which were incorporated into the primary health care system in line with the community health strategy.<sup>[21]</sup> Among these strategies are Baby Friendly Hospital initiative (BFHI), Infant Young Child Feeding policy (IYCF) and breastfeeding recommendation based on prevention of mother to child transmission of HIV.<sup>[22]</sup>

However, a large portion of infants are not exclusively breastfed

according to the infant feeding recommendations because delivery by the majority of women in Kenya and other less developed nations are home based and often attended to by trained or untrained birth attendants.<sup>[22,23]</sup> However, Adegoke and van den Broek observed that, the BFHI strategy alone may not have a positive effect on EBF rates.<sup>[23]</sup> While the Kenya Demographic and high prevalence, nor does it provide detailed information on predictors of EBF in specific groups such as HIV-infected women. Identifying factors associated with good breastfeeding practices in different contexts is assumed to facilitate better advocacy and wider coverage of exclusive breastfeeding in the Country. Therefore, this study was aimed at determining the predictors of exclusive breast feeding among HIV-positive mothers by using qualitative and quantitative methods in order to elicit information to collaborate data on knowledge of mothers and practice on the same (EBF) in Kenya.

## Material and Methods

### Study sites

The health facilities that were included in the study were; Kitale District hospital (DH), Turbo Health Centre (HC), Moi Teaching and Referral Hospital, Kabarnet DH and Mosoriot HC.

### Study design

This was a descriptive cross-sectional study.

### Study population

This included all the HIV positive mothers attending all the five critical care centers in North Rift region of western Kenya.

### Sampling design and sample size

The sample size was calculated according to the formula below. This formula was adopted because it is suitable for single proportion study.

$$n = \frac{z^2 p q}{d^2}$$

Where;

$n$  = Desired sample size required if population is greater than 10,000.

$z$  = The standard normal deviate at 95% confidence levels.

$P$  = Proportion in target population estimated to have specific characteristics

$d$  = The level of statistical significance set at 5% or 0.05.

$q = 1-p, (1-0.5) = 0.5$

A 'p' of 50% was adopted because the prevalence of HIV among mothers of reproductive age in the North Rift is not known.

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

The desired sample size = 384

Where population is less than 10,000 then the following formula

applies;

$$nf = \frac{n}{1 + (n/N)}$$

Where:

nf = The desired sample size when population is less than 10,000

n = The desired sample size when the population is more than 10,000

N = The estimate of the population size

(Number of mothers registered at Comprehensive Care Clinics was 902, AMPATH, 2009)

$$nf = \frac{384}{1 + (384/902)} = 270$$

The required sample size was 270.

To cater for non-response and refusal to participate, the sample size was inflated by 10%.

$$10\% \text{ of } 270 = 10/100 \times 270 = 27.$$

Therefore, final sample size was  $270 + 27 = 297$ . In addition, the sampling distribution among the study sites was calculated basing on the proportional using Koul, 1984 using the formula  $n_i/N$  where Where n = desired sample size i = total eligible mothers at the study site (selected facility) while N = total eligible mothers in five selected study sites. This translated to Kabarnet 40, Kitale 93, MTRH-Eldoret 86, Mosoriot 38 and Turbo 40.

### Focus group discussion (FGD) and key informers interview (KII)

The participating mothers were purposively selected as they come to the health facilities and the first 10 translating to FGD 1 participating at the Health Centre, the next 10 FGD 2 at the District Hospital and last 10 FGD 3 at MTRH. These were asked questions from the questionnaire until saturation of information of all the themes was reached when no new information was elicited (saturation was attained). In addition, the Key Informers Interview (KII) was purposively selected since they are in charges of their department and was expected to give relevant information and was divided into two groups. The first group was composed of three PMTCT clinical officers, two nurses trained in PMCTC and two nutritionist working at AMPATH comprehensive care clinics.

## Results

### Demographic characteristics

The socio-demographic characteristics of HIV positive mothers on exclusive breast feeding participated in the study as shown in Table 1. A total of 297 HIV- positive mothers attending five Comprehensive Care Clinics were interviewed as shown in Table 1. Their mean age in years was  $31.1 \pm 5.1$ . On marital

status, 183 (61.6%) were married while 143 (48.1%) had attained primary level of education. Most respondent (95.2%) 283 were Christians while (28.3%) 84 were casual laborers. Majority of the respondents (83.5%) had good knowledge (having defined exclusive breastfeeding as breastfeeding infant without any food or liquid for the first 6 months). Majority of the respondents 240 (80.8%) had the correct perception on exclusive breastfeeding. On ethnicity, majority 114 (38.4%) were kalenjin. Most of the respondents 192 (64.6%) reported that their choice of feeding method was not influenced by any the cultural factors. However, among those who reported cultural factors as having influenced their choice of infant feeding, were 65 (21.9%) who reported

**Table 1: Demographic characteristics of HIV positive mothers on exclusive breast feeding.**

Characteristics	Response	N (%)
<b>Marital status</b>	Single	40 (13.5)
	Married	183 (61.6)
	Separated/Divorced	22 (7.4)
	Widowed	51 (17.2)
	Other	1 (0.3)
<b>Religion</b>	Christian	283 (95.2)
	Muslim	7 (2.4)
	Others	7 (2.4)
<b>Parity</b>	1-2	80 (26.9)
	3-4	158 (53.2)
	≥5	59 (19.9)
<b>Education level</b>	None	7 (2.4)
	Primary	143 (48.1)
	Secondary	102 (34.3)
	College/University	45 (15.2)
<b>Occupation</b>	Business	61 (20.5)
	Farmer	36 (12.1)
	Salaried	42 (14.1)
	Casual labourer	84 (28.3)
	Housewife	74 (24.9)
<b>Ethnic group</b>	Kalenjin	114 (38.4)
	Luhya	101 (34)
	Kikuyu	27 (9.1)
	Luo	19 (6.4)
	Others	36 (12.1)
Knowledge on EBF	Good	248 (83.5)
	Poor	49 (16.5)
Perception on EBF*	Correct	240 (80.8)
	Incorrect	57 (19.2)
	Stigma	65 (21.9)
<b>Cultural</b>	Traditional beliefs	24 (8.1)
	Husband as a final decision maker	9 (3.0)
	Use of herbal medicine	7 (2.4)
<b>Income</b>	None	192 (64.6)
	Income group 1 (0-4 000)	105 (35.4)
	Income group 2 (4 001-12 000)	96 (32.3)
	Income group 3 (12 000-150 000)	96 (32.3)

Mean age (years)  $31.1 \pm 5.1$

\*An overall perception score was obtained by summing up all the scores and dividing by four. All those respondents who scored 0.75 and above were considered to have correct perception on exclusive breastfeeding. Details on perception responses are provided in Table 2.

stigma while 105 (35.4%) started that their average monthly income was Ksh. 4,000 and below.

An assessment of participants' perception regarding EBF, indicates that 263 (88.6%) of the mothers perceived all babies born to HIV positive mothers likely be infected with HIV as shown in Table 2. However, 234 (78.8%) believed breastfeeding babies do not need other fluids/herbs before six months of age. In addition, 251 (84.5%) of the respondents perceived that EBF can prevent transmission of HIV from mother to child and (234) 78.8% believed that infants born to HIV positive mothers and are given mixed feeds are at higher risk of HIV infection than those exclusively breastfed.

When the respondents were asked to state the mode of feeding their babies during the first six months, 188 (63%) stated that they breastfed their babies for the first six months without introducing other feeds, while 101 (34%) practiced mixed feeding as describe in Figure 1.

Breastfeeding methods based on study site as shown in Figure 2 indicate that in Kabarnet 27 (67.5%) were practicing EBF while 13 (32.5%) didn't. In Kitale, 63 (67.7%) practiced EBF while 30 (32.3%) didn't. At the MTRH, 42 (48.8%) while 44 (51.2%) didn't. At Mosoriot, 27 (71.1%) practiced EBF while 11 (28.9%) didn't. Lastly in Turbo, 29 (72.5%) practiced EBF while 11 (27.5%) didn't.

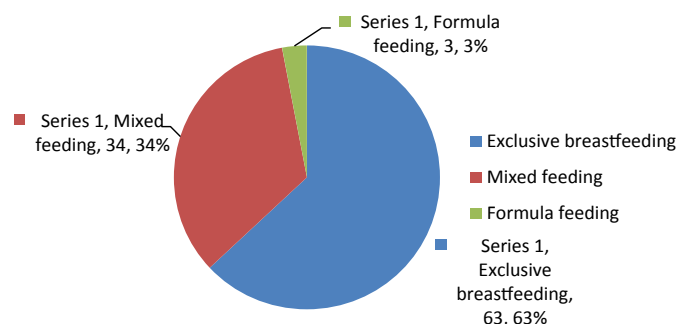
### Socio-demographic predictors of EBF

On socio-demographic factors associated with exclusive breastfeeding as describe in Table 3, education level, occupation, religion, knowledge and perception were found to have a relationship with practice of exclusive breastfeeding. Mothers with primary or/secondary education, those who were casual labourers, house wives or farmers and those of Christian faith had a significant exclusive breastfeeding. Mothers who had good knowledge as well as those who had correct perception towards EBF had a significant relationship with EBF ( $p < 0.05$ ).

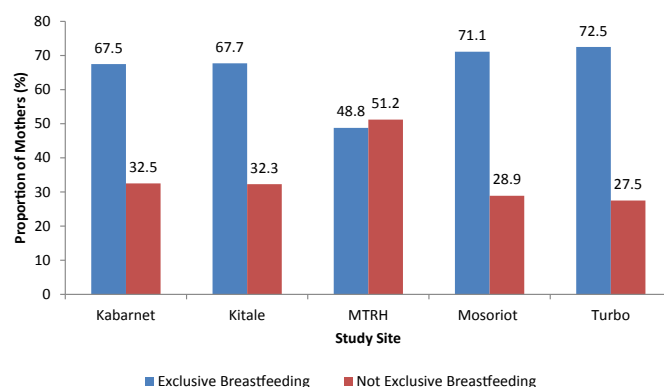
On social-demographic factors that are independently associated exclusive breastfeeding, level of education, occupation knowledge and perception were found to influence the practice exclusive breastfeeding as shown in Table 4. Also, mothers who had attained secondary school and college/university level of

**Table 2: Perceptions of HIV positive mothers on exclusive breastfeeding.**

Perception	Agree N (%)	Neutral N (%)	Disagree N (%)
All babies born to HIV positive mothers are likely to be infected with HIV	263 (88.6)	4 (1.3)	30 (10.1)
Breastfeeding babies also need other fluids/herbs before six months of age	61 (20.5)	4 (1.3)	232 (78.1)
Exclusive breastfeeding can prevent transmission of HIV from mother to child.	251 (84.5)	13 (4.4)	33 (11.1)
Infants born to HIV positive mothers who receive mixed feeding are at higher risk of HIV infection than those exclusively breastfed	234 (78.8)	21 (7.1)	42 (14.1)



**Figure 1: Feeding methods practiced by HIV-positive mothers.**



**Figure 2: Breastfeeding methods by study sites.**

education were more likely to practice exclusive breastfeeding than mothers without formal education. There was no statistically significant difference between mothers who had attained primary level of education and those with no formal education in the practice of exclusive breastfeeding ( $p > 0.05$ ). In addition, mothers whose occupation was business or farming were five times more likely to practice exclusive breastfeeding compared to housewives. Though not statistically significant, mothers of Christian faith were more likely to practice exclusive breastfeeding than those of other faith ( $p > 0.05$ ). Mothers who had good knowledge on exclusive breastfeeding were 28 times more likely to practice exclusive breastfeeding than those with poor knowledge. Mothers who had correct perception on exclusive breastfeeding were nine times more likely to practice exclusively breastfeeding than those with incorrect perception.

When asked what factors hinder (make mothers not practice) exclusive breastfeeding, the following responses were given by discussants in the FGDs:

Mothers' perception:

*"Babies need other fluids in addition to breast milk for good health. They cry most of the time because the breast milk alone is not enough. The child does not cry when we also give cow's milk"* [FGD 3].

*"A baby can feed on breast milk alone for maximum of three months after which other foods need to be introduced"* [FGD 1].

These responses reflect that mothers perceive breast milk not to be enough to satisfy the infant and that supplementing breast milk with cow's milk and other foods is necessary (incorrect perceptions). This influences the mother's practice, reflected in the response from the key informant expressed below:



**Table 3: Relationship between socio-demographic factors and exclusive breastfeeding.**

Characteristic	Exclusive breastfeeding		$\chi^2$	p-value	
	Yes (%)	No (%)			
Education	None	1 (0.3)	6 (2.0)	25.231	0.000
	Primary	75 (25.3)	68 (22.9)		
	Secondary	79 (26.6)	23 (7.7)		
	College/University	33 (11.1)	12 (4.0)		
Parity	1-2	54 (18.2)	26 (8.8)	1.425	0.490
	3-4	100 (63.3)	58 (36.7)		
	≥5	34 (57.6)	25 (42.4)		
Occupation	Business	39 (13.1)	22 (7.4)	13.516	0.009
	Farmer	29 (9.8)	7 (2.4)		
	Salaried	33 (11.1)	9 (3.0)		
	Casual labourer	47 (15.8)	37 (12.5)		
Religion	Housewife	40 (13.5)	34 (11.4)	16.522	0.002
	Christian	185 (62.3)	98 (33)		
	Muslim	3 (1.0)	4 (1.4)		
Marital status	Others	0 (0)	7 (2.4)	4.850	0.333
	Married	119 (63.3)	64 (58.7)		
	Single	23 (12.2)	17 (15.6)		
	Widowed	34 (18.1)	17 (15.7)		
Ethnic group	Others	12 (6.4)	11 (10.1)	1.365	0.323
	Kalenjin	72 (38.3)	42 (38.5)		
	Luhya	70 (37.2)	31 (28.4)		
	Kikuyu	18 (9.6)	9 (8.3)		
	Luo	10 (5.3)	9 (8.3)		
Knowledge	Others	18 (9.6)		71.639	0.000
	Good	183 (73.8)	65 (26.2)		
	Poor	5 (12.2)	44 (89.2)		
Perception	Correct	180 (75)	60 (25)	50.506	0.000
	Incorrect	13 (22.8)	44 (77.2)		
Mean age (sd) in years		31.3 ± 4.7	30.8 ± 5.6	0.824‡	0.411

All values in the table are presented as proportions except where specified; and tests of differences as  $\chi^2$  except where specified. sd (standard deviation) ‡t-value

**Table 4: Influence of social-demographic factors on exclusive breastfeeding.**

Factor	OR (95% CI for OR)	P - value
<b>Education level (ref= None)</b>		
Primary	5.97 (1.077 3.038)	0.188
Secondary	11.21 (1.854 6.781)	0.008
College /University	15.03 (4.984 8.486)	0.001
<b>Occupation (ref=Housewife)</b>		
Business	4.78 (1.444 1.789)	0.010
Farmer	5.37 (1.154 2.503)	0.032
Salaried	5.69 (0.343 9.437)	0.225
Casual Laborer	1.49 (0.705 3.155)	0.296
<b>Religion (ref=Other)</b>		
Christian	8.09 (0.837 7.829)	0.071
Muslim	0.63 (0.021 1.992)	0.793
Knowledge on exclusive breastfeeding	27.77 (1.515 7.316)	0.000
Perception on exclusive breastfeeding	9.42 (4.737 8.744)	0.000

“Mothers exclusively breastfeed their babies only for about three months then initiate mixed feeding because they think that breast milk alone is not enough for the baby after some time” [KII 2].

Education:

“Women who do not have good education may not understand the information on exclusive breastfeeding that we are given at

the health facility. Those who have a good education understand the messages well because they understand messages like the risk of mixed feeding” [FGD 2].

This reflects that women perceive good education as enabling understanding of reasons why they should exclusively breastfeed hence are more likely to do so. This is supported by a quote from one of the KIIs indicated below:

*“Having attained secondary level of education help mothers understand the concepts of mother-to-child transmission of HIV, thus enabled them to breastfeed the babies for six months without introducing other foods” [KII 6].*

Occupation:

*“When a woman is employed and stays at work for long, she is not able to exclusively breastfeed” [FGD 1]*

*“When a woman is working, she has to leave her baby at home and so she cannot feed the baby on breast milk only” [FGD 3].*

*“Whenever mothers leave their babies under the care of relatives or other people, they (the other people) end up giving the baby other foods”.* [FGD 2].

These responses reflect that mothers view occupation as a hindrance to exclusive breastfeeding because they are not available to feed their babies on breast milk and also that in their absence other persons feed the babies other foods.

In the current study as shown in Table 5, mothers who reported to have been influenced by stigma, traditional beliefs, husband as final decision maker and use of herbal medicine were compared with mothers who reported that none of the factors influenced their choice. The outcome observed that all these factors were found to influence mothers' practice on exclusive breastfeeding.

Triangulation of information obtained from quantitative data, FGDs and views of health workers were assessed through KIIs. The quotes below were generated when participants were asked about the cultural factors hindering the practice of exclusive breastfeeding;

#### Use of herbal medicine

*“In our culture [Kalenjin] we commonly use herbal medicine, to prevent illness and treat infant illness before babies attain the age of six months, and cannot give breast milk alone when the child is ill.”* [FGD 3].

This reflects that herbal medicine is given in addition to breast milk when a child is ill. These are usually in form of drinks that render a child not to have been exclusively breastfed.

#### Support from spouse

*“We women do not get support from our husbands to only feed our babies on breast milk especially if we have not disclosed our HIV-status. Many husbands do not understand about feeding babies on breast milk alone and want to see that cultural beliefs and norms such as giving baby cow's milk- are followed.”* [FGD 1]

This is supported by a response from one of the KIIs:

*“Male partners traditionally make key decisions on infant feeding yet may not be adequately informed on exclusive breastfeeding in prevention of HIV”* [KII 3]

The husband is a key decision-maker and influences whether or not the spouse can exclusively breastfeed through either enforcement of cultural practices. Women also perceived that that lack of knowledge of their husbands on exclusive breastfeeding could be a hindrance.

**Table 5: Influence of Cultural factors on practice of exclusive breastfeeding.**

Factor	OR (95.0 % CI)	P-value
None*	Ref	
Stigma	0.09 (0.036- 0.0231)	
Traditional beliefs	0.04 (0.013 0.114)	<b>0.000</b>
Husband as a final decision maker	0.01 (0.001 0.043)	<b>0.000</b>
Use of herbal medicine	0.05 (0.009 0.270)	<b>0.000</b>

\*Cultural factors did not influence choice to breastfeed

Support from family members/fear of stigma; support from health workers and support groups:

*“Older women and relatives would want to see the baby fed with other foods and if we mothers resist then, they treat us with suspicion because some of them have heard that if you have HIV then you don't give the baby other food”* [FGD 3].

*“When we get support from our husbands and other relatives, especially when we have disclosed our status we are able to feed our babies on breast milk only”* [FGD 2]

*“Information we get when we have health education from the health workers help us to feed our babies on breast milk only. Our support groups which we hold monthly at the CCCs also help us to feed our babies on breast milk only”* [FGD2].

Mothers who exclusively breastfed their infants attributed their success as expressed in FGD 2 to *“psychosocial support group at the CCCs”, from “health care providers, support from their spouses and/or relatives”,* after disclosure of their HIV status to them.

Failure to exclusively breastfeed babies as expressed in FGD 1, 2 and 3 and KII 3 was attributed to the following: *“male traditionally making decision on infant feeding”, “use of herbal medicine”, “lack of disclosure of HIV status” to either spouse or close relatives; that feeding the baby with breast milk alone could raise questions and they could end up being stigmatized”,* and lack of *“access to adequate information on facts about HIV”* and exclusive breastfeeding.

#### Influence of economic factors on exclusive breastfeeding

Assessment on the association of economic factors with exclusive breastfeeding, economic status variable was generated based on reported family average monthly income as shown in Table 6. In the analysis, mothers who reported a family average monthly income of less than Ksh. 4 001 (1st tertile) (reference) were compared with mothers who reported an income of Ksh. 4 001 or more (i.e., 2nd and 3rd tertiles). There was no significant difference in the practice of exclusive breastfeeding between mothers in the 1st and 2nd tertiles ( $p>0.05$ ). Mothers whose income fell in the 3rd tertile were 5 times more likely to practice exclusive breastfeeding than mothers in the 1st tertiles.

Some quote from FGDs supporting above are as reflected in the subsequent quotes. *“Mothers in families that can afford food that promotes good milk production can feed their children on only breast milk because they have enough milk”.* [FGD 3]

“Due to low income, mothers do not feed well hence do not produce enough breast milk so they also feed their babies with cow or formula milk.” [FGD 3]

“If a woman has good income she is able to make her own decisions so she can decide to feed her baby on breast milk alone.” [FGD 2].

Income as expressed in FGD 1, 2 and FGD 3 was associated exclusive breastfeeding, with low income failing to exclusively breastfeed reason being “non-affordability of food believed to promote breast milk production” while those with good income exclusively breastfed their babies citing ability to “make independent decisions in matters pertaining to feeding their babies”.

### Main predictors of exclusive breastfeeding

The study observed that factors influencing exclusive breastfeeding include; education level, knowledge, perception, cultural factors and income as shown in Table 7. Results indicated that educational level, stigma, traditional beliefs and knowledge on exclusive breastfeeding independently influenced the practice of exclusive breastfeeding among the HIV positive mothers ( $p < 0.05$ ).

Likewise, mothers who had formal education especially those who had attained college or university education were eighteen times more likely to practice exclusive breastfeeding than those without formal education. Also, respondents who had good knowledge on exclusive breastfeeding were eighteen times

**Table 6: Influence of Economic factors on exclusive breastfeeding.**

Income Tertiles	OR (95.0 % CI)	P-value
Income group 1 (< KShs 4001)	Ref	
Income group 2 (KShs 4001-12000)	1.71 (0.848 3.459)	0.134
Income group 3 (KShs 12001-150000)	5.14 (2.001 3.190)	<b>0.001</b>

**Table 7: Example of FGD and KII results showing the three themes.**

Themes	Quotes/ Characteristics	FGD Number
<b>Theme 1 (Socio-demographic factors)</b>		
Education level	Good level of education helps us to understand messages on exclusive breastfeeding	FGD 2
	Whenever we leave our babies under the care of relatives or other people, they (the other people) end up giving the baby other foods	FGD 2
Occupation	Those of us who are employed and stay at work for longer hours, are not able to exclusively breastfeed.	FGD 1
	When a woman is working, she has to leave her baby at home and so she cannot feed the baby on only breast milk	FGD 3
Knowledge on exclusive breastfeeding	Exclusive breastfeeding involves giving the baby breast milk alone without introducing other food up to when the baby is six months old	FGD 1
	Information we get when we have health education from the health workers help us to feed our babies on breast milk only. Our support groups which we hold monthly at the CCCs also help us to feed our babies on breast milk only	FGD 2
	We mainly get information from the clinic and support groups.	FGD 1,
	Babies need other fluids in addition to breast milk for good health. They cry most of the time because the breast milk alone is not enough. The child does not cry when we also give cow's milk	FGD 3
Perceptions on exclusive breastfeeding	From the clinic, we understand that exclusive breastfeeding prevents transmission of AIDS to the baby but we think water is also good for the baby's health.	FGD 2
	A baby can feed on breast milk alone for maximum of three months after which other foods need to be introduced	FGD 1
	We attribute the success of exclusive breastfed to support groups at CCCs and health education from health workers,	FGD 2
	Generally if the baby is to be protected from being infected by the mother through breastfeeding, then exclusive breastfeeding is the way to go,	FGD 2
<b>Theme 2 (Cultural factors)</b>		
Stigma	Older women and relatives would want to see the baby fed with other foods and if we resist then, they treat us with suspicion because some of them have heard that if you HIV positive then you don't give the baby other food	FGD 3
	Babies are routinely fed on cow's milk before six months of age.	FGD 1
Traditional beliefs	We are influenced by older women in decisions related to infant feeding where they recommend that babies be fed on other foods apart from breast milk.	FGD 3
	We women do not get support from our husbands to only feed our babies on breast milk especially if we have not disclosed our HIV status. Many husbands do not understand about feeding babies on breast milk alone and want to see that cultural beliefs and norms such as giving baby cow's milk- are followed	FGD 1
Male partner support	When we get support from our husbands and other relatives, especially when we have disclosed our status we are able to feed our babies on breast milk only	FGD 2
	Male partners rarely accompany their spouses to the comprehensive care clinics or antenatal clinics, thus miss the opportunity to receive information on facts about the role of exclusive breastfeeding in prevention of mother-to child transmission of HIV	FGD 1

Use of herbal medicine	In our culture [Kalenjin] we commonly use herbal medicine, to prevent illness and treat infant illness before babies attain the age of six months, and cannot give breastmilk alone when the child is ill	FGD 3
	We normally give babies herbal medicine as a cultural norm.	FGD 1
<b>Theme 3 (Economic factors)</b>		
Family income	Due to low income, we do not feed well hence do not produce enough breast milk so we also feed their babies with cow or formula milk	FGD 3
	with good income we are able to make our own decisions on breast feeding.	FGD 2

more likely to exclusively breastfeed their infants than mothers with poor knowledge.

However, mothers who stated that stigma predisposes infant feeding choice were 99.8% less likely to exclusively breastfeed their infants compared to those who did not chose stigma as having influenced their choice. Also, mothers who reported that traditional beliefs influenced their choice were 99.9% less likely to exclusively breastfeed their infants compared to those who did not select traditional beliefs as having influenced their choice. Perception that husband as a final decision maker, use of herbal medicine and income were found not to influence the practice of exclusive breastfeeding ( $p > 0.05$ ).

For easier interpretation of Odds Ratios  $< 1$ , Odds Ratio is converted to reflect percentage difference using the formula:  $(OR-1) \times 100$  and also applies to the subsequent percentage of 99.9% [Table 8].

## Discussion

Infant infected HIV with feeding remains a global public health challenge regardless the advances in biomedical research when it comes to feeding. While tremendous gains have been achieved in treatment and prevention strategies, prevention of mother-to-child transmission (PMTCT) of HIV continues to be a dynamic and rapidly changing field. When infants are exclusively breastfed for the first six months of life, there is stimulation of immune system, reducing risk of diseases like diarrhea and acute respiratory infections, which are among the commonest cause of infant morbidity and mortality in developing world.

Of the 297 HIV-positive mothers attending five CCCs participated in the study, their ages ranged between 26 and 36 years with an equal representation attaining primary and secondary level of education. In the current study, the prevalence of exclusive breastfeeding in the first 6 months of birth among HIV-positive mothers in the North Rift to be 63%. This proportion although about twice the national prevalence of 32%,<sup>[21]</sup> it is still much lower than the 90% level recommended by WHO.<sup>[24]</sup> However, a study carried out in Zambia observed that 74% adhered to exclusive breastfeeding among HIV positive mothers<sup>[25]</sup> while in another study, the results were slightly higher (80.4%).<sup>[26]</sup> The current study shows higher values than a household descriptive where 17% women in rural Papua New Guinea practiced exclusive breastfeeding.<sup>[26]</sup>

In the current study, the level of education influenced mothers' practice on exclusive breastfeeding, with mothers who had attained college/university level being more likely to practice exclusive breastfeeding. These findings are similar with those reported elsewhere where higher educational level of the mother

**Table 8: Main predictors of exclusive breastfeeding.**

FACTOR	OR (95.0 % CI for OR)	P-value
Education level (College/University)	17.67 (0.906 2.522)	<b>0.000</b>
Knowledge on exclusive breastfeeding	17.85 (3.806 8.372)	<b>0.000</b>
Perception on exclusive breastfeeding	1.06 (0.286 3.962)	0.927
Stigma	0.19 (0.092 0.394)	<b>0.000</b>
Traditional beliefs	0.03 (0.007 0.154)	<b>0.000</b>
Husband as a final decision maker	1.05 (0.287 0.398)	0.928
Use of herbal medicine	1.67 (0.908 2.213)	0.133
Income	1.39 (0.906 2.132)	0.132

enhances the practice of exclusive breastfeeding.<sup>[27,28]</sup> This has similarities with study findings from Nepal, Tunisia and Tanzania.<sup>[6,29,30]</sup>

In contrast,<sup>[31]</sup> mothers with higher education level and employed, are less likely to breastfeed their infants than those with lower than secondary education and/or those with no employment. In the current study occupation was found to be a predictor of whether a mother exclusively breastfeeds the baby or not, with those whose occupation was business or farming being more likely to exclusively breastfeed than housewives. Similar findings were reported<sup>[28,32]</sup> that occupation positively influenced exclusive breastfeeding. In contrast however, being a housewife has been associated with high prevalence of exclusive breastfeeding, as these women are presumed to have enough time to be with their infants and have more opportunity to practice exclusive breastfeeding<sup>[33]</sup> than those who do not have chance to stay at home due to work or other reasons.<sup>[29]</sup>

In this study knowledge on exclusive breastfeeding was found to influence the practice of exclusive breastfeeding among HIV-positive mothers in the study. Similar findings observed that factors influencing exclusive breastfeeding among HIV-positive mothers in Uganda reported that the knowledge on exclusive breastfeeding as a method of preventing MTCT positively influenced exclusive breastfeeding.<sup>[34]</sup> Similarly, factors influencing exclusive breastfeeding is mother's knowledge about HIV transmission.<sup>[35]</sup> From FGDs maternal clinics were found to be an important source of information on breastfeeding for mothers as compared to friends and other sources. Health facilities and health service providers are trusted sources of knowledge and information and apart from increasing counseling efforts at facilities they should be leading in organizing linkage with community groups regarding breastfeeding.<sup>[36]</sup>

The present study found that focus group discussions also supported a common perception that breastfeeding plays a major role in preventing mother-to-child transmission of HIV. Correct perceptions such as "breastfeeding babies do not need



other fluids/herbs before six months of age” enhanced exclusive breastfeeding since mothers with these correct perceptions were more likely to exclusively breastfeed their babies. This indicates that the subjects in the study had mainly grasped important underlying information necessary to promote chances of exclusively breastfeeding their infants.

The impression that all babies born to HIV-positive mothers were more likely to be infected with HIV was the main incorrect perception which could act to deter HIV positive mothers in this setting from exclusively breastfeeding their babies. The finding of the current study that perception influences practice of exclusive breastfeeding corroborates findings which observed that HIV-positive mothers who had positive perceptions such as believing that they can produce enough breast milk and exclusive breastfeeding is a method of PMTCT were more likely to exclusively breastfeed their babies.<sup>[34]</sup> Other studies have reported similar findings which showed that favourable perceptions such as a mother perceiving that exclusive breastfeeding is a method of PMTCT and that a baby can be born without HIV infection enhanced the practice of exclusive breastfeeding.<sup>[25,37]</sup>

In this study, use of other fluids and mixed feeding are still of concern since more than 20% of the mothers either did not agree or were neutral to the practice and that would lead to MTCT of HIV. Reason for early initiation of complementary food according to the study was inadequate breast milk. The mother’s perception of “insufficient breast milk” is a well-known problem hindering optimal exclusive breastfeeding practice in many communities.<sup>[4,38,39]</sup> Also, another study reported that mothers who perceived that their breast milk is insufficient both in quality and quantity gave supplementary feeds.<sup>[40]</sup> Since some of these perceptions expressed in focus group discussions are common perceptions in the study group. Similar areas where this misperception has been observed is in Tanzania, Zambia, Nigeria and Nigeria.<sup>[28,41-43]</sup>

In this study, stigma, traditional beliefs, husband as a final decision maker as well as use of herbal medicine were found to influence the mothers’ practice of exclusive breastfeeding. These findings are consistent with another study which observed that mother’s choice of infant feeding was influenced by traditional beliefs or family members were less likely to exclusively breastfeed their babies.<sup>[44]</sup> Similarly,<sup>[45]</sup> mothers who had reported influence by spouse and social stigma did not practice exclusive breastfeeding. Also, in a study on cultural barriers to exclusive breastfeeding among mothers in a rural area of Cameroon, exclusive breastfeeding be included in family support and disclosure of HIV status.<sup>[35]</sup> Similarly, that women who are HIV positive weaned early to avoid stigmatization by their families and communities, making it difficult for them to exclusively breastfeed their babies.<sup>[46]</sup>

Findings from the FGDs conducted in the current study further observed that male partners who were not supportive to mothers influenced the practice of exclusive breastfeeding negatively, especially where status was not revealed. The findings that use of herbal medicines is one of the cultural factors that is a barrier

to practice of exclusive breastfeeding are also consistent with other studies<sup>[47]</sup> which observed that common practice of giving infants herbal mixtures for their protection and that breast milk does not contain adequate nutrients for infant growth, led to giving infants extra fluids before the recommended age. However, mothers who achieve success in exclusive breastfeeding are those with ability to resist pressure from the family to introduce other fluids, the strong belief in the benefit of breastfeeding, and a supportive home environment.<sup>[48]</sup>

Family monthly income, as an economic factor was found to influence the practice of exclusive breastfeeding. Mothers falling in the third income tertile (monthly income >Kshs 12,000), when compared to those with a monthly income of Kshs 4,000 shillings, were more likely to practice exclusive breastfeeding. This study is similar to one on infant feeding among HIV infected women receiving PMTCT services in a Kenyan hospital who found that the practice of exclusive breastfeeding was dependent on the socio-economic status of mother.<sup>[49]</sup> Another study with similar findings was reported in infant and young child feeding practice among mothers living in Harar, Ethiopia and in USA.<sup>[50]</sup>

The findings of the current study are consistent with others which observed that economic status influenced infant feeding among HIV-positive mothers in Northern Tanzania.<sup>[40]</sup> The study showed an increase in the practice of exclusive breastfeeding with increase in income. However, a study in Bangladesh found that the mothers from households belonging to a richer wealth quintile were more likely to exclusively breastfeed their infants than those belonging to the poorest wealth quintile.<sup>[51]</sup> In the current study, most of the mothers (75%) were engaged in some income generating activity both in formal and informal sector. In contrast, a study in Brazil, reported prevalence of exclusive breastfeeding to be higher among children belonging to the poorest wealth quintile.<sup>[52]</sup> This study has found that comprehensive health education during ANC visits has the potential of influencing the mothers’ understanding and dedication to exclusive breast feeding and should form the holistic interventions to improve breastfeeding and exclusive breastfeeding rates. In addition, strengthening the counseling being provided during antenatal visits of mothers in health institutions and reinforcing counseling of the HIV positive mothers on safer infant feeding options is recommended.

## Conclusion

The study concluded that the prevalence of exclusive breastfeeding in the first 6 months of birth among HIV positive mothers is 63%, which is lower than the 90% level recommended by WHO. Mothers with formal level education, especially college/university level are more likely to practice exclusive breastfeeding than those with no education. Stigma, traditional beliefs, husband as a final decision maker and use of herbal medicine are cultural factors that negatively influence the practice of exclusive breastfeeding among HIV positive mothers. The practice of exclusive breastfeeding increases with increase in monthly income.

## Recommendations

This study recommends that since healthy mothers are the key to the well-being of their children family members should be involved in infant feeding counseling and health education programs, especially with regard to exclusive breastfeeding practice. Since family support is important and it can be easily be integrated into PMTCT within the national guidelines to improve the uptake of exclusive breastfeeding. There is need for the implementers and policy makers to set aside more funds so as to accelerate exclusive breastfeeding practice among HIV positive mothers. However, since health workers are the sole supporters of infant feeding practices, in particular exclusive breastfeeding, there is need to build their capacity to make sure they have current information and positive attitude towards EBF.

## Strength of the Study

This was one of the few studies done to determine the predictors of exclusive breast feeding among HIV-positive mothers in North Rift region of western Kenya.

## Limitation of the Study

The findings obtained cannot be generalized because the sample size was from a small geographical area of Kenya while the study recruited a small number of respondents and only those that were present during data collection and consented were included in the study. However, the study was able to achieve its objectives of determining predictors of exclusive breast feeding among HIV-positive mothers in northern region of Kenya.

## Competing Interest

The authors declare that they have no competing interests.

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## Author's Contributions

Authors NKR, PA and RO conceived the study and its design. PA and RO supervised data collection and analyzed the data. All authors drafted the manuscript, revised it for its intellectual content and approved the final version and are accountable for the article. NKR and GK prepared the manuscript and submitted for publication.

## Ethical Approval and Consent to Participate

Moi Teaching and Referral Hospital Ethical Research Committee Ref no. 000357 and the consent were obtained from all the mothers who were selected for the study.

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