

**Maternal Knowledge of Mother-to-Child Transmission of HIV and Breastmilk Alternatives for HIV-Positive Mothers in South-Western Kenya.** By Oguta TJ, Omwega AM & Sehmi of Applied Nutrition Programme, Department of Food Technology & Nutrition, University of Nairobi, P.O. Box 442, Uthiru- Nairobi, KENYA.

### **ABSTRACT**

Mother- to- Child Transmission (MTCT) of HIV is a relatively new concept in rural populations and despite the huge amount of work that has been done on HIV/AIDS, there still remains a dearth of information in knowledge of mothers on this concept especially in areas related to appropriate feeding methods for infants born to mothers infected with the virus. This cross-sectional study was designed to determine maternal knowledge on MTCT of HIV in the rural setting and to examine viable breastmilk alternatives for mothers who would be HIV positive in rural South-Western Kenya. One hundred and twelve non-tested mothers having infants aged 0-12 months in the community plus 11 HIV positive mothers were studied.

The results show that maternal knowledge on MTCT of HIV was low 8.9% in the study area. However, the non-tested mothers indicated that MTCT knowledge can influence the choice of feeding for their infants ( $p=0.001$ ;  $OR=1.41$ ;  $95\%CI, 1.04-3.86$ ). Those with high MTCT knowledge tended to be more receptive in considering feeding alternatives other than cow milk like expressed breastmilk ( $p=0.15$ ), formula ( $p=0.036$ ;  $OR=2.44$ ;  $95\%CI, 1.66-6.04$ ) and milk from milk bank ( $p=0.015$ ;  $OR=1.34$ ;  $95\%CI, 1.13-5.50$ ). Three feed alternatives- cowmilk, formula and wet-nursing were viable with varying socio-cultural, economic and/or nutritional constraints.

In conclusion, cow milk is the most familiar/common, socio-culturally acceptable and accessible breastmilk alternative in this community and its quality can be improved by appropriate micronutrient supplementation and dilution under hygienic conditions. Programmes aimed at improving cow milk supply, water & sanitation, family planning services and infant-feeding counseling can help reduce MTCT rate in this area.

### **INTRODUCTION**

In Kenya, over 2 million people are infected with HIV, a national prevalence of 13.9% that is, one in every eight persons and over 100,000 of these are children (1). It is estimated that 35% of under-five mortality is due to HIV/AIDS (Table 1). In children, 90% of HIV transmission is as a result of mother- to- child transmission (MTCT) during pregnancy, delivery or breastfeeding (2). MTCT rates vary considerably with between 25 and 45% among primarily breastfed populations of Sub-Saharan Africa (3). Studies from Kenya estimate the rate at 20-44% (4; 5). About 30% of women going for antenatal care in Kenya are diagnosed HIV positive in sentinel screening (1) and given that nearly 1 million babies are born annually

(6), over 300,000 babies are at risk of contracting the virus every year.

Breastmilk contributes about 15% risk of HIV transmission, 16-32% in Kenya (4; 5). Therefore, it may be preferable to replace breastmilk for mothers who are infected especially if the only consideration were to prevent HIV from infecting the child through breastmilk. The use infant formula is widely recommended to HIV infected mothers in industrialized countries, however, for infected mothers living in poor conditions in developing countries, it is important to consider the risks related to not breastfeeding and suitability of the alternative feeding methods (7). Some infant feeding methods have been suggested and seem to have merit in theory but not much has been done to determine their practical feasibility especially in the African rural settings.

This paper reports the results of a study on the maternal knowledge on MTCT of HIV and what would be viable breastmilk alternatives for infants born to HIV positive mothers. It also considers the socio-cultural, health, technological and economic conditions surrounding the choice of such practices among the rural inhabitants of South Western Kenya.

## **MATERIALS AND METHOD**

### *Study Population*

The study population included non-tested mothers with infants aged 0-12 months in Homa-Bay District and a sub sample of HIV positive mothers with children 0-2 years old. The district is inhabited by the Luo ethnic group and is one of the Kenyan districts with the highest HIV prevalence. A number of socioeconomic factors are thought to contribute to the rapid spread of HIV/AIDS in this community among them being the culture of widow inheritance, absence of circumcision practice, polygamy, migrant fishing, after-burial ceremonies and belief in cultural curse (*chira*).

### *Study Design*

This was mainly a cross sectional and exploratory study among mothers of the reproductive age. This design is appropriate for generating data on the current knowledge of MTCT of HIV and the practices related to alternative infant feeding.

### *Inclusion Criteria*

Women with infants aged 0-12 among the general population were recruited for the study in the administration of questionnaires, while HIV positive women with children aged up to 2 years were recruited as sub-group for observational study.

### *Exclusion criteria*

Women who did not have children or whose children were more than the above stated ages were excluded. Those that were so ill to participate in the interviews were also excluded from the study.

### *Ethical Issues*

Permission to carry out the study was obtained sequentially from the Government through the Ministry of Education, District Commissioner, District Medical Officer of Health and the Matron of Homa-Bay District Hospital. Informed consent was obtained from the mothers to participate in the study after explaining to them the objectives of the study and all the information collected on each individual was held in confidence, concealing the identity of the subjects.

### *Sampling & Sample Size*

Sampling was purposive, clustered and consecutive. Homa-Bay district was purposively selected because of its high HIV prevalence and MTCT rate and by virtue of it being one of the three pilot districts/sites for a national programme on Prevention of Mother- to- Child Transmission (PMTCT) of HIV. The pilot study is carried out by Network of AIDS Research of Eastern & Southern Africa (NARESA) in collaboration with UNICEF and National AIDS & STD Control Programme (NAS COP) of Kenya. Two divisions- Nyarongi and Riana were also purposively selected because they have the highest Infant Mortality rates in the district (8). The divisions were then clustered into 25 villages randomly selected. Mothers with infants aged 0-12 months who gave informed consent were consecutively recruited for the study within a period of 2 months until the predetermined number required was attained.

Sample size calculation was based on the HIV prevalence (30%) among antenatal women in sentinel screening in the district (1). Choosing a power of 90% and 2-tailed levels of significance of 5 % and allowing attrition rate of 10% at least 89 subjects were required for the study from the method and formula by Fisher *et al.* (9). An adequate number of non-tested 112 women were finally involved in the study in addition to a 11 HIV positive mothers.

### *Data Collection Techniques*

The study applied both quantitative (Questionnaires) and qualitative research tools (Key informant interviews, Observation, Focus Group Discussions (FGD) and Case Studies) for data collection to ensure good quality of data. A semi-structured questionnaire was administered on 112 mothers. Four FGD sessions were conducted with participation of 8 members in each group with a total of 16 women and 16 men. The women participants were aged 18-45 years old while their male counterparts aged 20-54 years old. FGD allowed verification of information obtained from questionnaires and exploration of factors that are difficult to obtain by questionnaires. Five experienced and/or elderly women aged 45-75 years old participated in key-informant interviews on areas related to traditional and contemporary alternative feeding practices. Eleven HIV-positive mothers were observed and monitored using an observation study guide on the actual infant feeding practices they opted for while four mothers participated as case studies. The four cases were those who had infants but were using different exemplary feeding methods for one reason or another. Two of them were HIV positive of

which one opted for formula and the other continued breastfeeding. The remaining two were non-tested and one used cowmilk while the other was a wet-nurse.

#### *Determination of MTCT Knowledge Index*

Six questions were used for scoring to develop MTCT knowledge index. The aspects of MTCT studied were whether children can get HIV/AIDS, timing of the MTCT- during pregnancy, delivery and breastfeeding and whether MTCT was preventable.

A response was considered valid if it provided the correct answer known (i.e. if it was a "Yes" response). Two points were given for every valid response and zero for invalid responses. A total score was calculated out of 12 points and used as MTCT knowledge indicator. The respondent's overall knowledge on MTCT of HIV was then rated on a scale of 0-12 and the respondent graded using four cut-off points as:

- 1= No knowledge at all (0 points)
- 2= Low MTCT knowledge (2-4 points)
- 3= Average MTCT knowledge (6-8 points)
- 4= High MTCT knowledge (10-12 points)

The ultimate knowledge of the population was taken at the number who provided valid responses (got 12 points) for all the six questions.

#### *Data Analysis*

Information obtained from the questionnaires were checked, verified and entered into a computer. Data entry, cleaning and analysis was done using EPI-INFO word processing database software. Analysis involved cross tabulations, odds ratios, frequencies of individual variables and their associations. Confidence intervals (95%) were obtained using categorical variables and the Pearson Chi- square tests were performed to check the statistical significance for the various hypothesized variables.

Information obtained from FGD and Key Informant Interviews that has been scribed in field notebooks and those recorded in electromagnetic tapes (cassettes) were verified, transcribed and descriptive analysis made/summarized out of it.

## **RESULTS**

#### *Knowledge on MTCT of HIV*

Maternal knowledge on MTCT of HIV in the study population was very low (8.9%, n=10) but significantly higher (63.6%, n=7) among the HIV-positive sub group (Table 2). In general, 35.7% had high MTCT knowledge, 45.5% were average while 5.4% had poor MTCT knowledge. Fifteen (13.5%) of the respondents had no knowledge of MTCT at all. There is low knowledge especially on the timing of MTCT of HIV (Table3). The general belief is that any HIV infected mother will

automatically infect her baby right in the womb and that this is not preventable.

### *Infant Feeding Options*

*Breastfeeding:* All except two, of the HIV-positive mothers who were interviewed breastfed their babies because they did not know their sero- status at pregnancy or early enough. Many of them said they would have preferred cowmilk as alternative feed. However, in the general population, nearly all respondents (98.2%) were breastfeeding their babies. Exclusive breastfeeding was not observed in the study.

*Cowmilk* is the most familiar/common and acceptable breastmilk alternative in the community (Table 4) mentioned by a large majority (84.8%). However, for many who do not own cows, getting the recommended 750ml (for a baby of about 5 kg) of cowmilk at Kshs 15 per day was still considered expensive. In a community where majority of the women have an average monthly income of less than Kshs 1500, this would imply spending as much as 45% on the baby food (cowmilk).

*Wet-nursing:* Generally the elderly women in the community who have reached menopause readily accept wet-nursing as ideal for an orphaned baby (usually their grandchildren or step children), but the young and middle aged women seem reluctant to endorse it as a suitable practice, taking into account the HIV/AIDS factor and suggest such children can be well cared for in children's homes.

*Formula:* A good number said that commercial infant formula was good in the sense that it was hygienic and prepared to suit the baby's nutritional needs, but decried the price. The formulas were reportedly expensive and would even expire on the shelves before they are bought, so they claimed. Even in a case where the baby was formula fed, exclusivity was not attained.

The use of *goatmilk*, *expressed breastmilk* and *powdered milk* was rare and was infrequently mentioned by the respondents. The idea of expressing and/or heating breastmilk and milk banks was strange and unacceptable to the community and the concept was met with disbelief. It was claimed that it is not normal to milk a human, breastmilk can not be expressed to produce enough to satisfy the baby, milking would make the breasts painful, and that breastmilk is so volatile that on heating it would evaporate altogether.

### *Case Studies*

The four case studies gave practical feeding alternatives opted for by different mothers under different conditions (Table 5).

## **DISCUSSION**

### *Knowledge on MTCT of HIV*

Although knowledge of HIV/AIDS in the province (99.8%) is very high (10), knowledge on MTCT of HIV has hitherto not been documented. From this study most of the respondents knew AIDS as a killer disease with no known cure and which is distinct from *chira* with which it has been confused before. However, knowledge on MTCT was very poor (8.9%)

The findings show that contrary to the expectations, MTCT knowledge had no significant effect on the breastfeeding practices like initiation, frequency, and duration of breastfeeding. These findings show how entrenched the norm of breastfeeding is in rural Kenya and are indicative of the fact that a majority of the population does not know their sero-status to actually change their childfeeding behaviours. However, it is interesting to see that MTCT knowledge had a negative correlation ( $p=0.01$ ) with the time of introducing complementary feeding. Those with high MTCT knowledge tended to introduce complementary feeds early. This could possibly be explained given that MTCT knowledgeable mothers happened also to be better educated ( $p=0.04$ ) and more likely to have better income and/or to be away from the baby working or doing some business.

The MTCT knowledge was found to influence the alternative feeding choice as mentioned by the non-tested mothers ( $p=0.001$ ; OR=1.41; 95% CI, 1.04-3.86). Those with high MTCT knowledge tended to be more receptive and considered feeding alternatives other than cowmilk like expressed breastmilk (0.15), formula ( $p=0.036$ ; OR=2.44; 95%CI, 1.66-6.04) and milk from milk bank ( $p=0.015$ ; OR=1.34; 95%CI, 1.13-5.50) than their counterparts with low MTCT knowledge. The MTCT knowledgeable mothers also understood and viewed with apathy ( $p=0.031$ ) rather than social rejection a woman who could not breastfeed her baby.

There is still a strong social stigma attached to HIV/AIDS with those who are positive being viewed as promiscuous or unfaithful and treated with ridicule and less compassion outside their immediate families. Most people equate being HIV sero-positive with having the AIDS disease and view it with fatalism. Many are able to differentiate HIV/AIDS from the long standing traditional curse, *chira* which has confusingly similar symptoms as HIV/AIDS. HIV testing is generally perceived to serve the purpose of confirming positive status especially when one suffers from prolonged (opportunistic) illnesses. Preventive testing to confirm negative status for eventual behaviour change is rear.

### *Feeding/care of orphans*

Orphans are traditionally distributed among close relatives who then take care of them in bringing them up socially, educating them, feeding them and buying them clothing. Such relatives were expected to adopt the orphan as one of their own children. If orphaned at an early age, the baby is preferably wet-nursed or taken care of by an elderly woman, more so the grandmother because of rooted socio-

cultural reasons. It was revealed that caring for orphans is becoming harder with increasing food insecurity, financial difficulties due to poverty. If not wet-nursed, such an orphan is fed on cowmilk until it is old enough to take *uji*, a soft porridge usually made from maize meal.

## **CONCLUSIONS**

The following conclusions can be made from the results of this study:

- MTCT knowledge among the mothers the study area is very low, despite the high awareness about HIV/AIDS.
- Cowmilk, with some external intervention is the most viable breastmilk alternative in the area of study.
- Wet-nursing is a viable breastmilk alternative at family level among the non-tested mothers, but not for the HIV positive mothers.

## **RECOMMENDATIONS**

1. It would be recommended that any intervention on the MTCT prevention should intensify health/nutrition education. Mothers going for antenatal care should be sensitized on vertical transmission of HIV and the risks faced by the forthcoming baby in addition to provision of voluntary & confidential counseling and testing (VCCT) services that currently exist only in hospital settings. VCCT should include counseling on infant feeding options.
2. The trend to encourage community-based care/feeding of (HIV/AIDS) orphans should be encouraged. A program that involves and supports the elderly and mothers in the community in feeding/caring for orphans should be initiated. Such a program should promote the supply of affordable.

**ACKNOWLEDGEMENT:** This study is part of a wider study undertaken by the Applied Nutrition Programme of the University of Nairobi with funding from **UNICEF- ESARO** to whom we are truly grateful.

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**Table 1: The percentage of Under- Five Mortality due to AIDS In Selected African Countries Projected for 2000-2005**

<i>Country</i>	<i>1998 U5 MR</i>	<i>% U5 Mortality due to AIDS</i>
Botswana	48	64
South Africa	83	50
Zimbabwe	89	50
Namibia	74	48
<b>Kenya</b>	<b>117</b>	<b>35</b>
Mozambique	206	26
Zambia	202	25
Liberia	235	22
Tanzania	142	20
Cote d'Ivoire	150	17

Source: UNICEF, 1999. Extracted from UN Population Division (1999)

**Table 2: MTCT Knowledge among the two Study Groups in percentage**

<i>MTCT Knowledge</i>	<i>General population (HIV status not known) (N=112)</i>	<i>Observation (HIV-positive) Study Group (N=11)</i>
No Knowledge at all	13.4	-
Poor/Low Knowledge	5.4	9.1
Average Knowledge	45.5	27.3
High Knowledge	35.7	63.6
Total	100	100
Ultimate Knowledge	8.9	63.6

**Table 3: Knowledge of the Mothers on the Timing and Prevention of MTCT**

<i>MTCT Timing and prevention</i>	<i>Response</i>					
	<i>General Population (N=112)</i>		<i>Sub- group (N=11)</i>			
	<i>Yes (%)</i>	<i>No (%)</i>	<i>Don't Know (%)</i>	<i>Yes (%)</i>	<i>No (%)</i>	
Don't Know (%)						
Pregnancy	77.7	5.4	17.0	90.9	0	9.1
Delivery	42.0	29.5	28.6	81.8	0	18.2
Breastfeeding	56.3	17.9	25.9	81.8	0	18.2
Preventable?	27.7	31.3	41.4	81.8	0	18.2

**Table 4: Breastmilk Alternatives as mentioned by the Respondents**

<i>Feeding Option</i>	<i>Response (N=112)</i>			<i>Total</i>	
	<i>Yes (%)</i>	<i>No (%)</i>	<i>Don't know (%)</i>		
<i>(%)</i>					
Wet-nursing	79.5	17.7	2.7	100	
Expressed, heat-treated breastmilk		12.5	60.7	26.8	100
Formula	88.4	5.4	6.3	100	
Breastmilk from Milk bank	12.5	55.4	32.1	100	
Cow milk	95.5	2.7	1.8	100	
Goat milk	13.4	61.6	25	100	
Dried milk powder	75.9	11.6	12.5	100	

**Table 5: Case Studies**

<u>Characteristics</u>	<u>Cases</u>			
	Case I	Case II	Case III	Case IV
Socio-economic profile	<ul style="list-style-type: none"> <li>• Aged 21</li> <li>• Married, polygamous family</li> <li>• Primary education</li> <li>• Peasant farmer with annual income of about Ksh. 12,000</li> <li>• Given birth 3 times and has lost 2, last born, a boy was 3 weeks old</li> </ul>	<ul style="list-style-type: none"> <li>• Aged 27</li> <li>• Married, monogamous</li> <li>• Secondary education</li> <li>• Runs a business with annual income of more than Ksh. 60,000</li> <li>• Given birth 4 times all alive. Last born 5 years old. Surrogate daughter is 2 months</li> </ul>	<ul style="list-style-type: none"> <li>• Aged 21</li> <li>• Married, monogamous</li> <li>• Primary education</li> <li>• Runs retail business with annual income of about Ksh. 15,000</li> <li>• Given birth once, first born, a boy aged one month</li> </ul>	<ul style="list-style-type: none"> <li>• Aged 34</li> <li>• Married, monogamous</li> <li>• No formal education</li> <li>• House wife with annual family income of about Ksh. 24,000</li> <li>• Given birth 11 times and has lost 4, last born, a boy was 2 months old.</li> </ul>
Feeding choice	<ul style="list-style-type: none"> <li>• Cow milk, due to breast infections</li> <li>• Baby has never been breastfed</li> <li>• Milk is donated by grandmother</li> <li>• Milk is boiled and diluted with pre-boiled water</li> <li>• Dilution ratio is 1:1</li> <li>• Fed on demand using a spoon</li> <li>• Left- over taken by the mother</li> </ul>	<ul style="list-style-type: none"> <li>• Wet-nursing, mother died after delivery</li> <li>• Has to bathe and take a cleansing herbal concoction before she can breastfeed the surrogate daughter</li> <li>• Introduced cow milk after growth faltering</li> <li>• Milk is bought, boiled and diluted with pre-boiled water</li> <li>• Dilution ratio is 1:1</li> <li>• Baby fed 8 times a day using a cup</li> <li>• Left- over taken by other children</li> </ul>	<ul style="list-style-type: none"> <li>• Breastfeeding</li> <li>• Fear not to breastfeed for possible stigmatisation by community and hostility from the spouse</li> <li>• Breastfeed on demand</li> <li>• Good attachment, but suckling is not effective</li> <li>• Complements with cow milk due to growth faltering</li> <li>• Milk is bought, boiled and diluted with a pre- boiled water</li> <li>• Dilution ratio is 1:1</li> <li>• Milk is fed 3 times a day using a cup</li> <li>• Left- over taken by the mother</li> </ul>	<ul style="list-style-type: none"> <li>• Infant formula</li> <li>• Opted for on advice from the hospital</li> <li>• Formula is donated by the hospital freely</li> <li>• Feed reconstituted with a pre- boiled water and fed on demand using a cup</li> <li>• Occasionally boiled water is given to the baby</li> <li>• A few times the baby has suckled from his mother while she is asleep</li> <li>• Left- over taken by the mother</li> </ul>
Health/ environmental conditions	<ul style="list-style-type: none"> <li>• Mother non- tested for HIV</li> <li>• Mother is sickling and suffers breast infections</li> <li>• Delivered under a TBA, birth weight not established</li> </ul>	<ul style="list-style-type: none"> <li>• Surrogate mother non- tested for HIV</li> <li>• Mother is well and healthy</li> <li>• Baby has episodes of diarrhoea and slow growth</li> <li>• From a BWT of 2.7 kg, the</li> </ul>	<ul style="list-style-type: none"> <li>• Mother is sero-positive for HIV and counselled</li> <li>• Mother looks healthy and positive</li> <li>• Baby is withdrawn and wasted</li> </ul>	<ul style="list-style-type: none"> <li>• Mother is sero-positive for HIV and counselled</li> <li>• Both look healthy and positive</li> <li>• Baby has normal growth</li> <li>• Mother maintains high</li> </ul>

	<ul style="list-style-type: none"> <li>• Baby looks healthy, but has not received any immunization</li> <li>• Latrine available, but mother does not wash her hands regularly</li> <li>• Drinking water fetched from a borehole is not treated</li> </ul>	<p>baby weighs 4.1 kg after 6 weeks</p> <ul style="list-style-type: none"> <li>• Mother maintains high sanitary and hygienic conditions</li> </ul>	<ul style="list-style-type: none"> <li>• From a BWT of 2.9 kg, the baby weighs down to 2.7 kg after 6 weeks</li> <li>• Baby has thrush in the mouth</li> <li>• Mother maintains high sanitary and hygienic conditions</li> </ul>	<p>sanitary and hygienic conditions</p>
MTCT Knowledge	<ul style="list-style-type: none"> <li>• Has some knowledge about MTCT but does not know it is preventable</li> <li>• Accepts wet-nursing, formula, cow milk and milk powder as possible feeding alternatives</li> </ul>	<ul style="list-style-type: none"> <li>• Has high knowledge about MTCT- timing of transmission and prevention</li> <li>• Accepts wet-nursing, formula, cow milk and milk powder as possible feeding alternatives</li> </ul>	<ul style="list-style-type: none"> <li>• Has high knowledge about MTCT- timing of transmission and prevention</li> <li>• Accepts formula, cow milk, milk powder and expressed/heat treated breast milk powder as possible feeding alternatives</li> </ul>	<ul style="list-style-type: none"> <li>• Has high knowledge about MTCT- timing of transmission and prevention</li> <li>• Accepts formula, cow milk, and milk as possible feeding alternatives</li> </ul>