Volume 20 Issue 5
Originally issued as K1

Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 1 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Factors Influencing the Timing of the First HIV Virological Test for HIV Exposed Infants; A Cross Sectional Descriptive Study of HIV Positive Breastfeeding Mothers and their Infants in 10 Selected High-Volume Health Facilities in a Rural District in Western Uganda

By Enos Mirembe Masereka, Edson Musungu Bwambale, Edson Katsomyo & Clement Munguiko

Mountains of the Moon University

Abstract- *Introduction:* Although Option-B plus has registered tremendous success in the Prevention of Mother to Child Transmission (PMTCT) of HIV, the failure to follow the HIV testing algorithm for HIV Exposed Infants (HEIs) after birth is likely to make achieving zero new HIV infections among children unrealistic. Due to this, we sought to determine the factors affecting uptake of first Polymerase Chain Reaction (PCR) test among HEIs to inform the selection of strategies to strengthen Early Infant Diagnosis (EID), an indicator that tracks progress towards achieving zero new HIV infections in children.

Keywords: *HIV virological test, PCR HIV test, HIV exposed, infants, western uganda.*

GJMR-K Classification: *NLMC Code: QW 168.5.H6*



Strictly as per the compliance and regulations of:

© 2020. Enos Mirembe Masereka, Edson Musungu Bwambale, Edson Katsomyo & Clement Munguiko. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Factors Influencing the Timing of the First HIV Virological Test for HIV Exposed Infants; A Cross Sectional Descriptive Study of HIV Positive Breastfeeding Mothers and their Infants in 10 Selected High-Volume Health Facilities in a Rural District in Western Uganda

Enos Mirembe Masereka [α], Edson Musungu Bwambale [σ], Edson Katsomyo [ρ] & Clement Munguiko [ω]

Abstract- Introduction: Although Option-B plus has registered tremendous success in the Prevention of Mother to Child Transmission (PMTCT) of HIV, the failure to follow the HIV testing algorithm for HIV Exposed Infants (HEIs) after birth is likely to make achieving zero new HIV infections among children unrealistic. Due to this, we sought to determine the factors affecting uptake of first Polymerase Chain Reaction (PCR) test among HEIs to inform the selection of strategies to strengthen Early Infant Diagnosis (EID), an indicator that tracks progress towards achieving zero new HIV infections in children.

Methods: This was a cross-sectional descriptive study conducted among 323 randomly selected HIV positive mothers and their HEIs receiving PMTCT services at10 selected ART accredited health facilities in western Uganda from 19thJuly to 19thAugust 2018. Data was collected using a questionnaire; HEIs, whose PCR test was taken within two months, and those after two months of birth were all randomly selected and included in this study. We used descriptive statistics to understand characteristics of HEIs and their mothers, and multivariable logistic regression model to obtain factors associated with first PCR testing among HEIs. Data were analyzed using SPSS version 20.

Results: Slightly more than half (54.2%) of HEIs had their first PCR test done after two months of birth. HEIs born to HIV positive mothers with more than three children were less likely to have their first PCR test within two months after birth (AOR = 0.47, CI= 0.318-0.789, p = 0.01), those whose mothers travel a distance less than 5 kilometers to the nearest health facility (AOR = 6.22, CI=4.223-9.865, p = 0.036) were more likely to have their PCR test within two months after birth, and those whose mothers were not informed about testing their HEIs for HIV within two months by the health worker (AOR = 0.39, CI =0.208-0.965, p = 0.042) were less likely to have the first PCR test within two months of birth.

Conclusions: we found out that slightly more than half of HEIs had their first PCR test done more than two months after birth. We recommend the implementation of policies fostering small families for HIV positive women, taking ART services closer to the people through outreaches and health workers informing HIV positive mothers about the correct timing for HIV testing of HEIs.

Keywords: HIV virological test, PCR HIV test, HIV exposed, infants, western uganda.

Author α: Department of Nursing & Midwifery, School of Health Sciences, Mountains of the Moon University P.O. Box 837, Fort Portal-Uganda, School of Medicine, Kabale University P.O. Box 317, Kabale-Uganda, Department of Public Health, Faculty of Health Sciences, Uganda Martyrs University P.O. Box 5498 Kampala-Uganda.
e-mail: mirembeenos@gmail.com
Author σ: Department of Public Health, Faculty of Health Sciences, Uganda Martyrs University P.O. Box 5498 Kampala-Uganda, Baylor College of Medicine, Kasese District Cluster-Uganda.
e-mail: ediebwa@gmail.com
Author ρ: Department of Nursing & Midwifery, Mountains of the Moon University P.O. Box 837, Fort Portal-Uganda.
e-mail: katsomyo@gmail.com
Author ω: Department of Nursing & Midwifery, Mountains of the Moon University P.O. Box 837, Fort Portal-Uganda, School of Health Sciences, Soroti University P.o. box 211 Soroti – Uganda.
e-mail: cclementmunguiko@yahoo.com

I. Background

Globally, about 36.9 million people were living with the Human Immunodeficiency Virus (HIV) in 2017;70% of these were residing in sub-Saharan Africa[1]. About 1.8 million people in the same year were newly infected, and of these, 180000 were children [1]. About 90% of children acquire HIV from their mothers during pregnancy, delivery, and breastfeeding [2]. However, the introduction of Option B- plus where HIV positive mothers are started on lifelong ART as early as possible in pregnancy and throughout breastfeeding has continued to yield tremendous results in the Prevention of Mother to Child Transmission (PMTCT) of HIV. This is shown by a decline in the proportion of new HIV infections among children by 35%from 270,000 in 2010 to 180,000 in 2017 globally [1] and by 50.6% from 31, 000 in 2011 before the introduction of Option B- plus in Uganda to 15,000in 2013[3].

The PMTCT strategy in Uganda comprises of the provision of treatment, care, and support to women

© 2020 Global Journals

infected with HIV, their children, and their families [4]. It also defines the postnatal PMTCT package for HEIs that includes Early Infant Diagnosis (EID) through first HIV PCR testing of HEIs within two months (between 6 and 8 weeks) of birth, followed by second HIV PCR testing at six weeks after cessation of breastfeeding and a rapid HIV test at 18 months of age [4]. Health workers, caretakers, and the community must follow the HIV HEI testing algorithm to achieve EID for appropriate prevention, treatment, care, and support; and to track progress towards achieving zero new HIV infections in children [4].

Despite the rollout of the HIV testing algorithm to health workers, timelines for these tests are not followed, affecting infant treatment, care, and support. In Uganda, only 40.2% in 2012, 41.9% in 2013, 33% in 2014, and 38% in 2015 of HEIs received a PCR test for HIV within two months of birth [3]. This was far below the national target of 80% [3] and indicated an increasing trend of missed opportunities for EID[3]. The poor timing of first virological HIV testing among HEIs is attributed to low rate of health facility deliveries, poor attendances for postnatal care services, low male involvement, poor sensitization, and cultural perceptions coupled with patriarchal based traditions which are dominant in Uganda [3, 4].

Delay in testing HEIs after birth makes breastfeeding mothers stay in a zone of comfort and not to put much effort on measures to prevent their HEIs from acquiring HIV; this predisposes to increasing HIV positivity rate among HEIs and retards the country's progress towards achieving zero new HIV infections among children [4]. Due to this, we sought to determine the factors influencing uptake of first PCR testing among HEIs to inform the evidence-based selection of strategies to improve Early Infant Diagnosis (EID) and ensure that every HEI testing positive is initiated on lifelong ART as soon as possible.

II. Methods

a) Study area, population and design

This study employed a cross-sectional descriptive study design and was carried out from 19th July to 19th August 2018. The study area had a total of 45 ART accredited health centers; of these ten high volume health centers located in Bwera, Kilembe, Rukoki, Hiima, Karambi, Kasanga, St Paul Cathedral, Katadoba, Kasese Municipality, and Bishop Masereka foundation in the Rwenzori sub-region, Western Uganda were selected. These were considered because of the large numbers of HEIs in care. The study included HIV positive mothers and their HEIs aged between 6 weeks and 18 months; those eligible forthe first PCR test and receiving PMTCT services from the selected health centers. These health centers had a total of 626 HEIs in care. The majority of HIV positive mothers selected for this study live along the foothills of the Rwenzori ranges where they engage in small scale crop growing, animal rearing, and business activities.

b) Sample size determination

The sample size was determined using the Leslie Kish survey sampling formula [10]; Z (the value from standard normal distribution) corresponding to desired confidence level of 95%, was 1.96, p is the proportion of HEIs who miss first virological testing within two months of birth, estimated at 69.8% (0.698)[3], e is the desired level of precision, set at 5% (0.05); arriving at N (actual sample size)of 323.

c) Sampling of study participants

We obtained lists of HIV positive breastfeeding women per selected health facility offering ART services by searching ART registers at the postnatal clinic for HIV positive mothers with HEIs aged 6 weeks to 18 months. The Art number, cohort, date of next appointment, and other details of every mother and infant found were written down. Preliminarily, each health facility had an independent list and later merged to come up with a single general list. All registered HIV positive breastfeeding women were entered in the computer excel sheet from which we randomly selected 323 HIV positive women and their infants.

The distribution of respondents per study health Center following random selection [table 1]

Table 1: Distribution of respondents per study health center

Health Facility	No Exposed Infants in Care	No. of Respondents
Rukoki Health Centre III	52	33
Bwera hospital	122	87
Kasanga PHC HC III	33	12
St Paul HC IV	34	5
Kasese Municipal HC III	135	65
Karambi HC III	20	6
Hiima Health Centre III	62	33
Kilembe Mines Hospital	123	66
Katadoba HC III	23	12
Bishop Masereka HC III	22	4
Total		323

HC: Health Centre

© 2020 Global Journals

Initially, we noted the date of the next appointment of each selected HIV positive mother and her HEI.We interviewed mothers as they came to the postnatal clinic at every study health centre. If amother did not turn up for services on her appointment date, she was followed up through existing follow up systems such as Village Health Teams (VHTs) and peer mothers the following day and interviewed from her home.

d) Data collection

Data was collected using a questionnaire. Questions on client socio-demographics, client factors, health center factors, and community factors influencing uptake of first PCR HIV test were asked. We asked questions related to the timing of the first PCR for HEIs, whether the mother was informed about testing her HEI within two months of birth or not and how mothers are generally handled at the clinic by the attending health worker. Data collection was done in separate rooms at the postnatal clinics of the different study health centers. Every woman who was followed up at home was requested to find a separate place in her compound or sitting room with maximum privacy and confidentiality. We asked mothers to respond to questions genuinely. We read the questions on the questionnaire as the participants listened. Participant responses were ticked on given responses on the questionnaire to minimize errors in recording.

e) Data analysis

Data were analyzed using SPSS version 20. Participant demographic characteristics were summarized using descriptive statistics. We used multivariable logistic regression to determine factors associated with low uptake of the first PCR test. Variables with p-value <0.2 after bivariate analysis were included in the multivariate logistic regression model.

f) Ethical considerations and protection of study participants

Approval from a local ethics committee at the Faculty of Health Sciences (FHS), Uganda Martyrs University (UMU), was obtained. Written consent was obtained from all mothers and legal caretakers of HIV Exposed Infants.

III. Results

a) Socio-demographic characteristics of respondents

A total of 323 mothers of HEIs participated in this study. Nearly half, 152(47.1%) of the respondents were Bakonzo by the tribe. About three quarters, 236(73.1%) were aged 25 years and above. Most, 227(70.3%) were married and living with their spouses. More than half, 203 (62.8%) had not completed the primary level of education [see table 2].

Table 2: Socio- demographic characteristics of respondents

Variable	Frequency (N=323)	Percentage
Age (in years)		
≤25	87	26.9
>25	236	73.1
Marital Status		
Married	227	70.3
Not married	96	29.7
Tribe		
Bakonzo	152	47.1
Other tribes	171	52.9
Education Level		
<primary level	203	62.8
≥primary level	120	37.2
Source of income		
None	103	31.9
Has income source	220	68.1
Monthly income (average)		
≤ 100,000	251	77.7
> 100,000	72	22.3
Has someone to escort her to health facility		
Yes	136	42.1
No	187	57.9
Has support for transport means to health facility		
Yes	256	79.3
No	67	20.7
Number of children born while mother is HIV-positive		
≤ 2	261	80.8
> 2	62	19.2

© 2020 Global Journals

Timing of first HIV virological test among HIV Exposed Infants in a rural District in Western Uganda

Slightly more than half of the HEIs, 175(54.2%)had their first virological test (PCR) after two months of birth.

Socio-demographic, client, and health center factors influencingtiming of first virological HIV test among HIV Exposed Infants in a rural district in western Uganda.

HEIs born to HIV positive mothers with more than three children were less likely to have their first PCR test within two months after birth (AOR = 0.47, CI=0.318-0.789, p = 0.001), those whose mothers travel a distance less than 5 kilometers to nearest health facility (AOR = 6.22, CI=4.223-9.865, p = 0.036) were more likely to have the first PCR test within two months, and those whose mothers were not informed about testing their HEIs for HIV within two months by the health worker (AOR = 0.39, CI=0.208-0.965, p = 0.042) were less likely to have the first PCR test within two months of birth [see table 3].

Table 3: Socio-demographic, client, and health center factors influencing the timing of first virological HIV test among HIV Exposed Infants in a rural district in western Uganda

Variable	Timing of first PCR		Unadjusted OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
	≤2months Freq (%)	>2 months Freq. (%)				
Tribe						
Bakonzo	81(54.7)	71(40.6)	1.76(1.19-7.83)	0.038	4.33(0.23-5.89)	0.432
Other tribes	67(45.3)	104(59.4)	1		1	
Religion						
Protestant	43(29.1)	80(45.7)	0.49(0.23-0.89)	0.001	0.54(0.45-8.46)	0.453
Other religions	105(70.9)	95(54.3)	1		1	
Number of children						
> 3	55(37.2)	107(61.1)	0.38(0.26-0.86)	0.001	0.47(0.32-0.79)	0.001*
≤ 3	93(62.8)	68(38.9)	1		1	
Knows the timing for confirmatory test						
Yes	80(54.1)	124(70.9)	0.48(0.21-0.68)	0.001	0.31(0.12-0.66)	0.015*
No	68(45.9)	51(29.1)	1		1	
Distance to health facility						
≤5 Kilometres	56(37.8)	41(23.4)	1.99(1.77-8.89)	0.004	6.22(4.22-9.87)	0.036*
>5 Kilometres	92(62.2)	134(76.6)	1		1	
Health worker informed mother about testing child for HIV within 2 months of age						
No	39(26.4)	63(36.0)	0.64(0.26-0.99)	0.041	0.39(0.21-0.97)	0.042*
Yes	109(73.6)	112(64.0)	1		1	
Handling of mothers at Health centre						
Well	35(23.6)	58(33.1)	0.62(0.96-0.88)	0.039	4.38(0.91-12.85)	0.545
Not well	113(76.4)	117(66.9)	1		1	

IV. Discussions

Slightly less than half (45.8%) of the HEIs had their first virological test within two months after birth, far below the national target of 80% [3]. Delay in testing HEIs makes women stay in a comfortable zone and are more likely to under estimate the risk that the infant can acquire HIV through breast feeding. Non-adherence tovirological testing among HEIs is a sign that the mother and her HEI are not retained in HIV care, which increases the risk of MTCT and consequently retarding the country's progress towards achieving zero new HIV infections among children [4].

In this study, an HIV positive mother having more than three children influences the timing ofthe first HIV virological test for her HEI. A mother is overburdened taking care of many children on addition to taking care of herself resulting in late first virological testing for her HEI[5]. The burden is worsened when a mother is single or in a polygamous family and thus not expecting any spousal support [5, 6]. Similarly, hailing from a distance less than 5 kilometers to the nearest health facility was more likely to cause infant PCR testing within two months after birth. Conversely, hailing from a distance more than 5 kilometers from a health facility results in untimely virological testing of HEIs.

© 2020 Global Journals

Long-distance to health center limits access to health services, especially with mothers who cannot afford transport costs. As a result, mothers keep on postponing dates of taking their HEIs to the health centre for virological testing. In so doing, HEIs are tested after two months of age [7, 8, and 9]. HEIs of HIV positive mothers not informed about testing within two months after birth were less likely to have their first virological tests within the recommended time. Similarly, mothers who knew the timing for the confirmatory test were less likely to have their HEIs tested within two months after birth. A mother knowing the date of the confirmatory test and not knowing the date of the initial virological test is an indication that health workers could have emphasized the timing of the confirmatory test more than the initial test. Due to this, mothers end up not following the timelines for the initial virological test. Poor information giving by health workers to HIV positive mothers contributes to delays in first HIV virological testing increasing the chances of HIV transmission to HEIs[11, 12].

V. Conclusions

We found out that slightly more than half of HEIs had their first PCR more than two months after birth. We recommend the implementation of policies fostering small families for HIV positive women, taking ART services closer to the people through outreaches, and health workers informing HIV positive mothers about the correct timing for HIV testing of HEIs.

Study limitation

The study relied on responses from mothers and some of these might have been affected by recall bias. We endeavored to clearly articulate the questions to ensure that the mothers respond accurately.

List of Abbreviations

HEI: HIV Exposed Infants
DBS: Dry Blood Sample
PCR: Polymerase Chain Reaction
ARVs: Antiretroviral Drugs
PMTCT: Prevention of Mother to Child Transmission
EID: Early Infant Diagnosis
VHT: Volunteer Health Team

Declarations

- *Ethical approval and consent to participate*

Approval was sought from a local ethics committee at the Faculty of Health Sciences, Uganda Martyrs University. Written consent was sought from all mothers and legal caretakers of HIV Exposed Infants.

Consent for publication

Not applicable

Availability of data and materials

All data and materials for this study shall be availed whenever requested by editorial team and other users. The data set can be accessed by sending a request to mirembeenos@gmail.com

Acknowledgement

The authors of this study would like to thank the leadership of Kasese District Local Government for allowing this study to be conducted in Kasese District, Western Uganda; we also thank all HIV positive breastfeeding women who participated in this study.

Funding

This study was entirely funded by the principal investigator

Competing interests

None of the authors has competing interest in this study

Authors' contribution

EMM and EMB conceived the study, collected data and participated in data analysis. EMM, EMB, EK and CM wrote the manuscript.

References Références Referencias

1. UNAIDS (2018). Fact sheet; World AIDS day 2018. The 2017 global statistics.
2. UNAIDS (2016). Fact sheet, Latest statistics on the status of the AIDS epidemic.
3. UAC. (2016). The HIV and AIDS Uganda Country Progress Report 2015-2016 (Health, Trans.) (pp. 1-73). Uganda AIDS Commission (UAC).
4. MoH (2016). Consolidated guidelines for prevention and treatment of HIV in Uganda. Kampala.
5. Merten, S., Ntalasha, H., & Musheke, M. (2016). Non-uptake of HIV testing in children at risk in two urban and rural settings in Zambia: a mixed-methods study. *PloS one*, *11*(6), e0155510.
6. Feyera, A., Megerssa, B., Legesse, D., & Hailemichael, F. (2017). Prevention of mother to child transmission of HIV/AIDS: Service utilization and associated factors among selected public health facilities in Ethiopia. *Medical Practice and Reviews, 8(1), 1-13.*
7. Lubogo, D., Ddamulira, J.B., Tweheyo, R. and Wamani, H. (2015). Factors associated with access to HIV care services in eastern Uganda: the Kumi home based HIV counseling and testing program experience. *BMC family practice*, *16*(1), p.162.
8. Gourlay, A., Wringe, A., Todd, J., Cawley, C., Michael, D., Machemba, R., ... & Zaba, B. (2015). Factors associated with uptake of services to prevent mother-to-child transmission of HIV in a community cohort in rural Tanzania. *Sex Transm Infect*, *91*(7), 520-527.
9. Grede, N., de Pee, S., & Bloem, M. (2014). Economic and social factors are some of the most common barriers preventing women from accessing maternal and newborn child health (MNCH) and prevention of mother-to-child transmission (PMTCT)

© 2020 Global Journals

services: a literature review. *AIDS and Behavior*, *18*(5), 516-530.
10. Kish, L, (1965). Survey sampling.
11. Cook, R. E., Ciampa, P. J., Sidat, M., Blevins, M., Burlison, J., Davidson, M. A., ... & Moon, T. D. (2011). Predictors of successful early infant diagnosis of HIV in a rural district hospital in Zambezia, Mozambique. *Journal of acquired immune deficiency syndromes (1999)*, *56*(4), e104.
12. Sam-Agudu, N. A., Ramadhani, H. O., Isah, C., Erekaha, S., Fan-Osuala, C., Anaba, U., ... & Charurat, M. (2017). The impact of structured mentor mother programs on presentation for early infant diagnosis testing in rural North-Central Nigeria: a prospective paired cohort study. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *75*, S182-S189.

Questions that were asked

	SECTION A: Client-related factors affecting uptake of first virological testing of HIV exposed infants
1	How old are you?
2	Are you married or staying with a spouse? a) Yes b) No
3	What is your tribe? a) Mukonzo b) Mutoro c) Munyankole, d) Musongora e) other (specify) ……..
4	What is your religion? a) Catholic b) Anglican c) Muslim d) Pentecostal e) SDA f) Other (specify)……
5	Which health facility do you receive your HIV drugs? …….
6	What is your level of education a) None b) primary c) secondary d) tertiary e) university
7	What do you do to earn a living? a) Peasant b) large scale farming c) business d) office work e) Other (specify) …….
8	How much do you earn per month (in Ugandan Shillings)?
9	Do you have someone to escort you to the hospital during pregnancy and delivery? a) Yes b) No
10	Do you have any one to support you on transport to the health centre? a) Yes b) No
11	How many children do you have?
12	How many children were born while you were HIV positive?
13	When did you get to know about your sero status? (Indicate month and year)
14	Is your husband aware about your HIV status? a) Yes b) No
15	Did you attend antenatal care for this current baby? a) Yes b) No
16	Where did you deliver from this baby? a) Health facility b) Home/with assistance of TBA c) Other specify …….
17	At what age are you expected to bring your baby for; a) First PCR……
18	At what age are you expected to bring your baby for; a) Second test ……
19	At what age are you expected to bring your baby for; c) Confirmatory test. ……..
	SECTION B: Health system factors affectig uptake of first virological testing of HIV exposed infants
20	How far is your home from this facility? a) Less than 5 km b) 5km and more
21	Do you sometimes miss an appointment because of the distance a) Yes b) No

© 2020 Global Journals

22	Has the nurse or doctor ever told you about testing the child for HIV? a) Yes b) No
23	How old was your child when blood was taken from him/her for HIV testing? a) Within 6-8weeks b) not within 6-8weeks c) other (specify) …….. Never taken
24	Were you given a referral letter to come and test your child for HIV when he/she is two and a half months? a) Yes b) No
25	Do you get all services concerning your child like immunization, testing, weighing from one place in this facility a) Yes b) No d) I do not know
26	How do the health workers treat you when you come for your medication? a) Well b) bad c) very bad d) declined to answer
27	Have you ever missed an appointment because of the way they treated you on the previous appointment a) Yes b) No c) not sure
28	Have you ever received a reminder about your appointment/ testing of your child at the facility before the actual day? a) Yes b) No
29	Have you ever been followed up when you missed your appointment/ testing of your child at the facility from the health workers or VHT/Peer mother a) Yes b) No
30	If yes in 29 above, how were you following up? a) Home visit by VHT/peer b) phone call c) health worker
	SECTION C: Community related factors affectig uptake of first virological testing of HIV exposed infants
31	Do you have TBA in the community you leave in a) Yes b) No
31	Have you been involved in peer groups for people living with HIV at the facility or in the community? a) Yes b) No
32	Have you had messages in your community sensitizing about how to protect you baby form acquiring HIV a) Yes b) No
33	Do you have any community health worker, VHT or peer mother that you know of in this community that provide you services about HIV? a) Yes b) No
34	If yes in question 33 above, which services do they provide you? a) Home visit b) community health education c) HIV testing counseling d) Referral to the facility e) follow up when you miss appointment f) Others specify…….
	The End Thank You So Much

© 2020 Global Journals