

Maternal and caretaker's knowledge of HIV infections and the existence and benefits of early infant diagnosis (EID) services at Kericho county referral hospital, Kenya.

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Abstract

This study was a cross-sectional analytical survey of the Maternal and caretaker's knowledge of HIV infections and the existence and benefits of early infant diagnosis (EID) services at Kericho county referral hospital in Kenya. Data was collected using pretested questionnaires administered to the postnatal HIV positive mothers and or caretakers of HIV exposed children. Data were analysed using SPSS software version 18.0. Moreover, it was presented using Chi-square and Logistic Regression analysis. Of the 254 respondents, 201 (79.1%) were biological mothers to the children; the rest were caretakers. The children were aged between 1 and 18 months, with a mean age of 9.62 months. Most respondents' knowledge of adult HIV infection is about what HIV is, routes of transmission, diagnosis and treatment. Knowledge of paediatric HIV infection was, however, inadequate with only 132 (52%) respondents who knew the approximate rate of HIV transmission from mother to child and 130 (51.2%) who knew about the availability of paediatric Antiretroviral (ARV) drugs. Both adult and paediatric HIV knowledge was better with an increasing level of education. The younger respondents were also more knowledgeable than, the older ones. Children who had utilised EID were only 75 (29.5%). In conclusion, EID knowledge is still lacking in Kericho County, and it influences the utilisation of these services. EID services and education on the availability should be decentralised where feasible. They should be included as an essential service at all levels of healthcare delivery to reach more children. Further research needs to be done on how to leverage HIV knowledge to increase the uptake of services and alleviate impediments to utilising services. Improving maternal education is strongly recommended, as it would enhance EID uptake.

Key Terms: Knowledge, EID, HIV, HIV Testing.

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1.0 INTRODUCTION

Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) have become global health challenges. It is a significant cause of infant and childhood morbidity and mortality in Africa. Children under 15 years make up nearly 5% of the total HIV positive population. The number of children in this age group who were estimated to be living with HIV in 2019 was 1.8 million worldwide, and the AIDS-related deaths were about 95 000 (UNAIDS/WHO, 2020). East and South Africa is home to 54% of the world's population living with HIV and AIDS (UNAIDS, 2019). An estimated 1.8 million children globally were living with HIV in 2019, of whom 150,000 were newly infected in 2019 (UNAIDS, 2020), mainly through MTCT during pregnancy, childbirth or breastfeeding. In Sub-Saharan Africa, HIV continues to be a problem due to a lack of information, testing services and antiretroviral therapy (USAID, 2016).

Problem Statement: HIV is one of the world's most serious public health challenges. There is a global commitment to stopping new HIV infections and ensuring that everyone with HIV has access to HIV treatment. However, access to treatment cannot be attained without access to testing; Access to testing is primarily influenced by knowledge. Unfortunately, access to HIV testing in children remains poor in many countries, creating a bottleneck for treatment scale-up (UNAIDS, 2016). WHO policy recommends immediate initiation of Antiretroviral Therapy (ART) for HIV positive children below two years of age (WHO, 2010d). However, without better ways to identify infected children, the policy alone will not change the treatment landscape for children. In 2015, in the 21 highest-burden countries, only 54% of children exposed to HIV were tested within the recommended two months (UNAIDS, 2016).

Children are more vulnerable to being lost to follow-up than adults are because they rely on their parents or caregivers to access healthcare services (Barneys et al., 2014). Some of the reasons children are lost to follow up include lack of caregiver contact information, stigma and counselling challenges, the burden on people to return for results, and weak follow-up within clinics (UNICEF/UNAIDS, 2009). There exists a lack of adequate knowledge regarding HIV and preventive practices against MTCT. Health education and awareness campaigns on MTCT prevention and VCT promotion should target women in their antenatal period to increase the acceptability and accessibility of these services (Sagili et al., 2015). Knowledge has been cited as one of the main factors that affect utilisation, with either inadequate knowledge (Adeleke et al., 2009) or superficial knowledge (Luo et al., 2008) being some of the reasons.

Among surveys conducted between 2011 and 2018, just 39% of young women (aged 15 to 24 years) in eastern and southern Africa demonstrated comprehensive knowledge of HIV, compared to 46% and 31% of young men in the same age group, respectively. This highlights the urgent need for education (UNAIDS, 2013). Therefore, the main objective of this study was to determine maternal/caretaker's knowledge on adult and

paediatric HIV infections, the existence of EID and its benefits and availability among mothers/caregivers at Kericho County Referral Hospital.

2.0 LITERATURE REVIEW

Globally 38 million people were estimated to be living with HIV, with an estimated 1.7 million people who were newly infected with HIV and 690,000 who died of AIDS-related illnesses worldwide in 2019; about 150,000 children became newly infected with HIV globally in the same year (UNAIDS/WHO, 2020). Sub-Saharan Africa remains most heavily affected by HIV, with 59% of the global population living with HIV. It accounts for 92% of pregnant women living with HIV worldwide (UNAIDS/WHO, 2012) and for 72% of global AIDS deaths, yet the region accounts for only 12% of the global population (UNAIDS/WHO, 2010). Women are more affected than men are, and they account for 59% of all the infected people in the region. In some countries, HIV prevalence rates among young women aged 15–24 are up to three times higher than for men of the same age group (UNAIDS/WHO, 2008). Out of the 38 million people living with HIV globally, 20.7 million live in East and Southern Africa (UNAIDS/WHO 2020). However, the decrease in HIV infections in these two regions between 2010 and 2019 has been larger than in any other region. In East Africa, HIV prevalence has stabilised, and there is even a decline in some areas.

HIV and AIDS remain a challenge in Kenya, despite the lower numbers of new infections reported. There were an estimated 100,000 new HIV infections in the country in 2009 (NASCOP, 2010). In 2016, women accounted for 910,000 of the 1.6 million people living with HIV in Kenya (UNAIDS, 2018). Among people between 15 and 49 years, HIV prevalence among women (8.0%) is almost twice that of men (4.3%) (KNBS, 2010). Young Kenyan women aged between 15 and 19 years are three times more likely to be infected than their male counterparts are, while 20–24-year-old women are over four times more likely to be living with HIV than men in the same age group (KNBS and ICF Macro, 2010). About 1411 pregnant women were living with HIV in Kericho County in 2013 (UNAIDS, 2019).

Children under the age of 15 years make up nearly 5% of the total HIV positive population. The number of children in this age group who were estimated to be living with HIV in 2019 was 1.8 million worldwide, and the AIDS-related deaths were about 95 000 (UNAIDS/WHO, 2020). Of this estimated 1.8 million children, 88% live in sub-Saharan Africa. Studies have demonstrated, knowledge of HIV/AIDS is an essential determinant for success in promoting safe practices and changing behaviours that pose risks to health (Cordes et al., 2017). Controlling the HIV/AIDS epidemic requires the general population to have accurate information about the prevention and transmission of the virus (Jung et al., 2013). In 2016, the United Nations Political Declaration on Ending AIDS proposed that, by 2020, 90% of young people (aged 15 to 24 years) should know to protect themselves from HIV (Joint UN Programme on HIV/AIDS, 2019). Young women were particularly likely to have insufficient knowledge

of HIV/AIDS and engage in risky sexual behaviour: condom use among young women was 19 percentage points lower than among young men (UN MDG 2015).

Indicators on HIV knowledge among young people are among the global indicators for measuring progress in the 2020 Fast-Track Commitments and Expanded Targets to End AIDS (Joint UN Programme on HIV/AIDS, 2020). For example, the 2015 Millennium Development Goals report indicated that, at the regional level, fewer than 40% of young people aged 15 to 24 years old in sub-Saharan Africa had comprehensive correct knowledge of HIV/AIDS using the most recent data (up to 2014) (UN MDG 2015).

Mother's knowledge on PMTCT of HIV is essential to use available prevention options. Women, who have adequate knowledge on HIV prevention, protect themselves, their husband and their children from HIV infection and are more likely to undergo HIV testing than women who do not have adequate knowledge on HIV (Alemu et al., 2017). Therefore, investigating the proportion and predictors for mothers' knowledge on the prevention of mother-to-child transmission of HIV in resource-limited settings has many benefits (Alemu et al., 2018).

3.0 METHODOLOGY

The study design was a cross-sectional analytical survey conducted in the postnatal and Child Welfare Clinic (CWC). It was on the mothers who had attended ANC at KCRH before delivery. In addition, there were home follow up visits, which were done with assistance from the PMTCT peer counsellors. The mothers were tested for HIV at the KCRH ANC clinic using an 'opt out' approach.

The formula used by Fisher *et al.* was used to calculate sample size in which the target was to include a minimum of 250 respondents, where children were alive. Purposive sampling was used by going through the register for the previous three years. The total number of confirmed HIV positive mothers in the ANC register was 716 for the three years. Systematic sampling was then used by selecting every second mother (hence 358). The target population was the HIV positive postnatal mothers and or caretakers ($n=358$) who had attended KCRH's ANC clinic. Out of the 358, twenty-eight were still in the antenatal phase, four children died before they attained the age of 6 weeks, 16 were not willing to participate, and 56 could not be traced at all. This left 254 respondents who were interviewed. Research instruments that were used in data collection were standardised structured pretested questionnaires.

Ethical Considerations: Approval was obtained from the Kenya Medical Research Institute (KEMRI) Institutional Review Board (REF KEMRI/RES/7/3/1). A research permit was obtained from the Kericho District Commissioner (ADM 15/3 VOL VII/83). The County Department of Health Services and the Medical Superintendent of KCRH granted permission. Informed Consent was obtained from every participant. Kiswahili translated and approved consent forms were administered to those who did not understand English. Those not willing to

participate were given their care without any negative implications. The data was kept confidential, and no names were used for anonymity.

4.0 RESULTS AND DISCUSSION

EpiData software Version 3.1 was used for data entry. Data was then analysed using Statistical Package for Social Sciences (SPSS) version 18.0. Finally, logistic Regression analysis was done using Stata 10 software.

Table 1: Characteristics of the Respondents

Variable	Description	(N=254)	%=100%
Age of Respondent	≤ 35 years	216	85
	>35 Years	38	15
Residence	Rural	181	71.3
	Urban	73	28.7
Relationship to Child	Mother	201	79.1
	Caretaker	53	20.9
Level of Education	None	4	1.6
	Primary	118	46.4
	Secondary	101	39.8
	College	31	12.2
Occupation	Businessperson/Farmer	152	59.9
	Housewife	63	24.8
	Formal Employment	39	15.3
ANC Attendance	Once	25	9.8
	Twice	49	19.3
	Thrice	76	29.9
	More than thrice	104	40.9
ANC HIV Counselling Sessions	Once	164	64.6
	Twice or More	49	19.3
	Not Sure	41	16.1
Place of Delivery	Home	129	50.8
	Health Facility	125	49.2

A. Characteristics of the Children

The mean age was 9.62 (9.62 ± 4.585) months. Thus, nearly all the children, 251 (98.8%), had been taken to the CWC, with a large proportion, 234 (92%), having been taken there by six weeks of age.

Table 4.2 Characteristics of the Children

Variable	Description	(N)	%
Birth Order	1 st Born	37	14.6
	2 nd -3 rd Born	133	52.4
	≥ 4 th	84	33
Previous admissions	Yes	74	29.1
	No	180	70.9
Rating of Child's Health	Perfect	171	67.3
	Fair	44	17.3
	Poor	39	15.4

The likelihood of EID being done was higher among those who were either first, second or third-born children ($\chi^2 = 31.031$, $df=5$, $P<0.0001$, $n=254$). Children were less likely to be tested if their birth order was fourth born or beyond (i.e. 5th, 6th etc.). There was also a higher probability of the child being tested if they had been previously admitted for any reason ($\chi^2 = 4.300$, $df=4$, $P=0.038$, $n=254$).

Respondents' Knowledge of Adult HIV Infection

There was relatively adequate knowledge of adult HIV infection among the respondents. Regarding the understanding of what HIV is, 237 (93.3%) of them correctly reported HIV to be caused by a virus, 3 (0.8%) thought it was bacterial, while 14 (5.5%) did not know. Most of the respondents were aware of the major routes of HIV transmission, namely: unprotected sex with an infected person (100%), transfusion with blood from an infected person (98%), Mother to Child Transmission (98.4%) and sharing of sharp objects with infected persons (98.8%). However, there were still some misconceptions with a few respondents who believed that HIV could be transmitted through kissing (15.7%), contact with the sweat of an infected person (8.3%), or through coughing (2%).

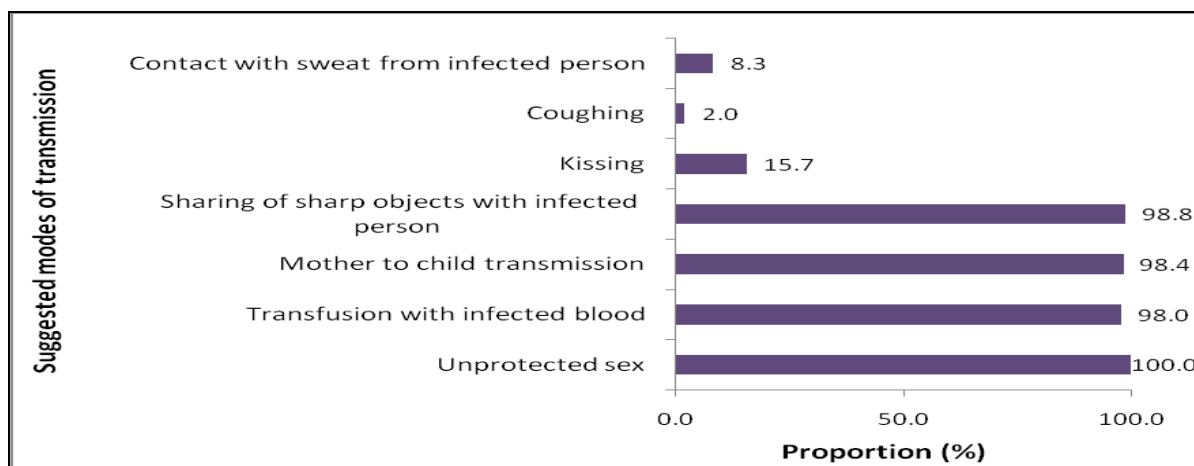


Figure 1 Respondents' Knowledge on the Modes of HIV Transmission (Multiple Responses Permitted)

Knowledge of HIV diagnosis in adults was sufficient, with 253 (99.6%) respondents stating correctly that HIV was diagnosed by testing blood. On the subject of a cure for HIV, a relatively large proportion of respondents, 191 (75.2%), reported that there is no cure for HIV as opposed to 21 (8.3%) who stated that there was, and 16.5% who did not know whether there was the cure or not.

When it came to knowledge about ARVs, 229 (90.2%) of the respondents correctly named ARVs as drugs used to treat persons with HIV to prolong and improve their quality of life as opposed to 25 (9.8%) who did not know what ARVs are. Furthermore, knowledge of what ARVs are was associated with obtaining EID for the child ($\chi^2=6.730$, $df=1$, $P=0.009$) ($n=254$).

Respondents' Knowledge of Paediatric HIV Infection

Knowledge of paediatric HIV infection was somewhat inadequate, with 198 (78%) of the respondents stating that MTCT was the only mode of HIV transmission to children. They did not know of other ways of HIV transmission to children, such as sharing sharp objects with an infected person and blood transfusion with blood from an infected person. On enquiry about the rate of HIV transmission through MTCT, it was noted that only about half of the respondents, 132 (52.0%), knew the correct rate of transmission. Knowledge of the rate of transmission was associated with having obtained EID for the child ($\chi^2=16.698$, $df=3$, $p<0.01$) ($n=254$).

On HIV diagnosis in young children, 185 (72.8%) of the respondents knew how a diagnosis is made. On the other hand, 32 (12.6%) thought it was diagnosed using rapid HIV test kits, and 37 (14.6%) did not know. Knowledge of HIV diagnosis in young children was significantly associated with having obtained EID for the child ($\chi^2=136.548$,

df=2, $p < 0.001$) (n=254). When asked about the effect of HIV infection in children, 217 (85.4%) respondents knew that HIV infected children would have increased morbidity and mortality rates, while 36 (14.2%) did not know. Only one respondent believed that they would grow up healthy without any intervention. Those who knew that children with HIV would have increased rates of morbidity and mortality were more likely to have utilised EID for the child ($\chi^2=17.022$, df=2, $p < 0.001$) (n=254).

Concerning the estimated length of time that the effects of HIV would begin to manifest in children, 202 (79.8%) respondents said correctly that the manifestation of signs and symptoms could be seen as early as at birth, only 7 (2.8%) said it could start at school-going age. In comparison, 44 (17.4%) did not know. Knowing that the effects of HIV could be noticed early in a child's life was associated with having utilised EID for the child ($\chi^2=23.453$, df=2, $p < 0.001$) (n=254).

It was observed that only about half of the respondents, 130 (51.2%), were aware of paediatric ARVs. Those who reported no ARVs for children were 96 (37.8%), while 28 (11.0%) did not know. Knowledge of the availability of paediatric ARVs was associated with utilising EID for the child ($\chi^2=45.831$, df=2, $p < 0.0001$). The majority of the respondents, 211 (83.1%), were aware of paediatric HIV services at the nearest healthcare facility. Knowing the availability of paediatric HIV services was significantly associated with having utilised EID for the child ($\chi^2 = 48.322$, df=1, $p < 0.001$) (n=254). Table 4.3 shows the association between paediatric HIV knowledge and EID uptake.

Table 3 Paediatric HIV Knowledge and Association with EID Uptake

Variable	Description	Number (n)	Percentage (%)	Significance (p-Value)
Rate of Transmission	Correct	132	52	<0.01
	Incorrect	122	48	
Paediatric HIV Diagnosis	Correct	185	72.8	<0.001
	Incorrect	89	27.2	
Effects of HIV on Child's Health	Correct	217	85.4	<0.001
	Incorrect	37	14.6	
Paediatric HIV Treatment (ARV)	Correct	130	51.2	<0.0001
	Incorrect	124	48.8	

Respondent's knowledge of the existence of EID, its benefits and availability

The majority of the respondents, 233 (91.7%), reported having known about EID before. This could be explained by the fact that all the mothers attended ANC clinic at KCRH where EID services were offered and were more likely to have been told about EID.

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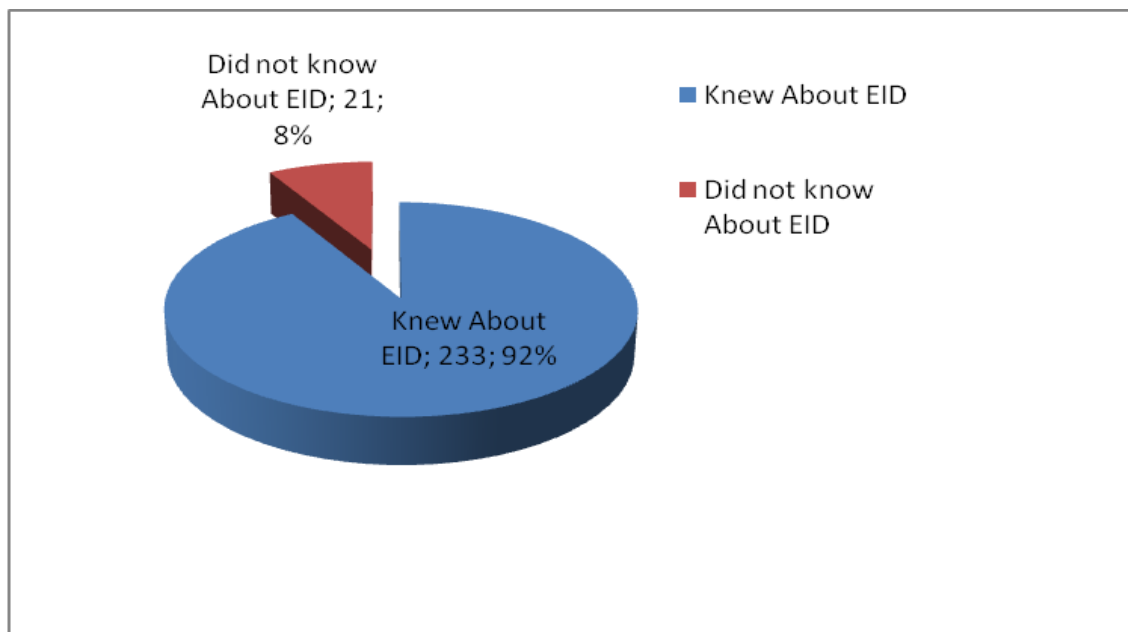


Figure 2: Respondents knowledge about the existence of EID

Timing of EID information was critical as it would determine whether the child would be tested on time as per the recommendations or not (it is fundamental for a mother to know about EID in the antenatal period, or if it is after delivery, it should occur before the child is six weeks old). On enquiry about the timing of EID information, only about half, 119 (51.1%) of those who knew about EID, knew about it before delivery while the rest, 114 (48.9%), knew about it after delivery. Among those who knew about it after delivery, only 34 respondents knew about it when the infant was six weeks old or before. The remaining 80 respondents knew about it when the infant was more than six weeks old. Figure 4.3 shows the timing of information on EID.

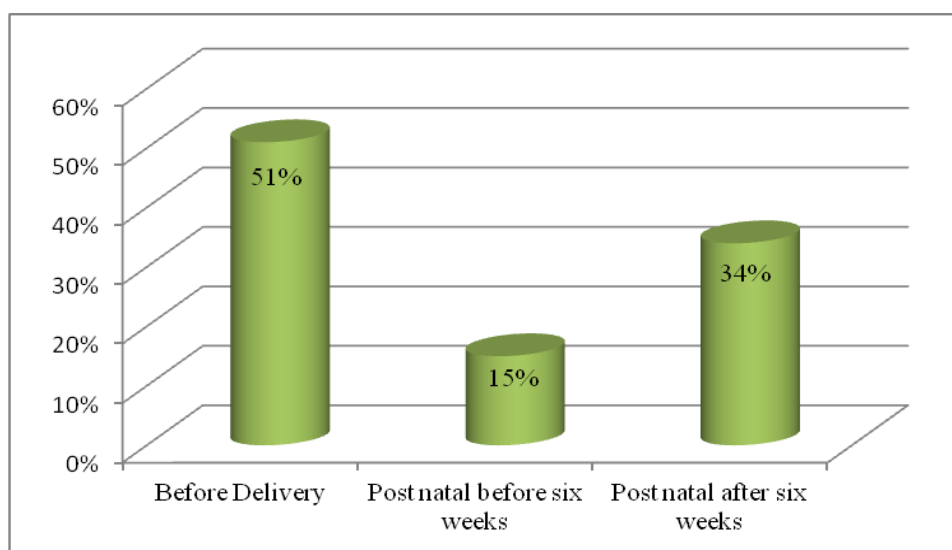


Figure 4.3 Timing of information on EID

There was adequate knowledge on the benefits of EID, with 236 (92.9%) respondents indicating that they knew the benefits of EID. Some of the benefits mentioned included: better health outcomes, early diagnosis of HIV, being able to start a child on the necessary treatment on time and fewer complications in the child's health. Concerning knowledge of the availability of EID services, a large proportion of the respondents, 207 (81.5%), knew at least one healthcare facility that offered EID services. When subjected to chi-square statistics, it was observed that knowing at least one facility that offered EID services was significantly associated with the child having been tested on time through EID ($\chi^2 = 102.582$, $df=1$, $P < 0.001$).

Table 4: Respondents' knowledge on benefits and availability of EID

Had Knowledge	YES	NO
Benefits of EID	236 (93%)	18 (7%)
Health Facility that Offered EID	207 (81.5%)	47 18.5%)

Respondents Knowledge of Paediatric HIV

Among the factors used to assess paediatric HIV knowledge, the knowledge on the rate of HIV transmission to children was subjected to Logistic Regression Model. Those who had inappropriate knowledge on the rate had a reduced log odds by 1.29 of having their children tested by six weeks of age compared to those who had adequate knowledge. This was significant ($p < 0.01$).

Respondents' Knowledge of the existence of EID

Knowledge about EID among the respondents increased the probability of the children being tested as it was significantly associated with the child having undergone EID ($\chi^2=60.045$, $df=1$, $p<0.0001$) ($n=254$). On the timing of information on EID, those who knew about EID before delivery had an increased Log odd by 1.29 of obtaining EID for their children at six weeks old compared to those who knew about EID after delivery. On the other hand, among those who knew about EID after delivery, those who knew the children were six weeks old had an increased log odd by 4.84 compared to those who knew about EID when their children were older than six weeks of age ($P<0.01$).

Conclusion: There was sufficient knowledge of adult HIV infection among the respondents. Paediatric HIV knowledge, on the other hand, was inadequate. The respondents also had sufficient information about EID and its benefits. However, for many of them, the timing of this information was late too late to facilitate the utilisation of EID services for the children.

The most significant factor that influenced EID utilisation was the level of education, $P=0.002$. Those with higher levels of education (up to secondary and beyond) were more likely to obtain EID services for the child than those with lower levels.

Discussion: The respondents demonstrated adequate knowledge of adult HIV infection, with 93.3% who knew what HIV is and 99.6% who knew about adult HIV diagnosis, although misconceptions remain. The findings are in keeping with several surveys such as KAIS 2007 and KDHS 2008-2009, where 98.3% and 99% of the respondents heard about HIV and AIDS. In addition, nearly all Kenyans have heard of HIV, according to the Kenya AIDS Epidemic update (Kenya AIDS Epidemic Update, 2011).

On the other hand, there was quite inadequate knowledge when it came to knowledge on pediatric HIV infection. These included HIV diagnosis in young children, the rate of HIV infection among HIV exposed children, the routes of HIV transmission to children, effects of HIV in children and availability of paediatric ARV drugs. It was noted that over two thirds, 198 (78%) of the respondents incorrectly thought that MTCT was the only route of HIV transmission to children. On the other hand, about half of the respondents, 132 (52%), knew the correct rate of HIV transmission to children through MTCT without any intervention.

This is consistent with the results from a study in Nigeria that found that more than half of the women did not know the correct rate of transmission (Adeleke et al., 2009). Nevertheless, the effects of HIV in young children was well understood, with 217 (85.4%) respondents indicating that there would be increased morbidity and mortality. This compares to the findings of the Population Council/Horizons project, conducted in the catchment areas of six health facilities offering pediatric HIV services in 3 provinces (Nairobi, Eastern and Nyanza) in Kenya, which found out that there was inadequate knowledge of Pediatric HIV infection with 50% of

respondents who knew the indications for HIV testing, 64% who knew availability of pediatric HIV services and 50% who knew about the availability of pediatric ARV drugs (Kiragu et al., 2008).

The main factors that affected knowledge were the age of the respondents and their levels of education. Knowledge significantly decreased with increasing age and increased with increasing level of education. This is in contrast to another study conducted in Homa Bay District Hospital in Kenya, which showed that there was no statistically significant difference between knowledge of teenage pregnant women compared with older pregnant women (Omweya et al., 2006). However, the Homa Bay study had a smaller sample size, lowering the power to detect associations.

Another factor that affected knowledge was the place of residence. Similar to studies conducted in Ethiopia (Alemu et al., 2018), Sudan (Mahmoud et al., 2007) and Tanzania (Falnes et al., 2010), a significant association between the place of residence and knowledge of adult and pediatric HIV infection was noted, with those residing in the urban areas being more knowledgeable. Other factors were the number of ANC clinic attendance made, the number of HIV counselling sessions attended, and delivery place. The limitation was that this study did not stratify the mothers' knowledge and that of the caretakers.

KDHS 2008-09 found out that the level of education was highly associated with knowledge about modes of transmission of HIV among both women and men aged between 15 and 49 years. Comprehensive knowledge increased with the rising level of education (KDHS 2008-09). This was consistent in this study and implied a need to improve the levels of formal education among the population to improve knowledge on HIV and AIDS. Improving public health education would also affect positively.

Informing mothers and the timing of EID information is essential. It was noted that 233 (92%) knew about EID, and 119 (51.7%) were informed before delivery. When mothers get to know about EID before delivery, they have time to think about it, and by the time of delivery, they will likely have made up their mind to have the child tested early enough. A study in Kilifi, Kenya, recommended that mothers be told about EID before delivery so that after delivery, it is only a matter of follow up (Hassan et al., 2011). More avenues of disseminating information on EID should be devised to equip mothers to be with timely knowledge.

Knowledge on the availability of EID services among the respondents was high. About 80% (206) knew at least one healthcare facility that offered EID. Knowledge of at least one such facility was associated with the utilisation of EID. On enquiry about their general opinion on the likely reasons that made mothers/caretakers not utilise EID, it was observed that lack of knowledge on EID's availability was one of the reasons. The Population Council/Horizon project likewise found that poor knowledge regarding the availability of pediatric HIV services was one of the barriers to obtaining early HIV diagnosis and treatment for children (Kiragu et al., 2008). Another study conducted in Nyanza province proved that community education positively affected knowledge, attitudes, and behaviour regarding HIV testing and treatment in children and infants (Kalibala et al., 2011). Most of the

respondents, 236 (92.9%), knew the benefits of EID. However, this study found that knowledge of benefits alone does not translate to the utilisation of the EID services.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusion: The maternal and caregivers knowledge of HIV influences the utilisation of EID services. Knowledge of HIV, EID and the availability and benefits is imperative if the necessary interventions have to be instituted promptly. Poor knowledge implies that there are missed opportunities to maximise the health benefits of EID to minimise the HIV disease burden among young children. For example, a large number of HIV infected children miss out on the benefits of early initiation of ART due to a lack of knowledge by the mother/caretakers. Lack of knowledge on the child's HIV status by the mother could also mean that a child who might not have been infected with HIV might become infected due to prolonged exposure through breastfeeding.

Recommendations: There is a need for further research on leveraging HIV knowledge to translate it into adequate utilisation of the available HIV care services such as EID utilisation. A more comprehensive evaluation of knowledge of both men and women in the community about HIV/ AIDS will provide added information for establishing effective community intervention programs.

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