Factors Influencing Repeat HIV Testing Among Mothers in Perinatal Clinics of Rural and Urban Settings in Kisumu County, Kenya

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Abstract

BACKGROUND

Over one million children are living with Human Immunodeficiency Virus (HIV), predominantly acquired from their mothers during the perinatal period. Most infections are in the developing world with over 90% of children with HIV being in sub-Saharan Africa. This study aimed to determine factors associated with low repeat HIV testing among mothers going to perinatal clinics. We looked into individual, provider and facility factors associated with repeat HIV testing.

METHODS

The study adopted a facility-based cross-sectional survey and a convergent mixed method. The study population were Women of Reproductive Age living in Kisumu County. Simple random sampling was used for quantitative analysis and an open-ended interview guide for qualitative analysis.

RESULTS

Out of the 407 respondents, 82 (20.15%) had received the full course of repeat HIV tests up to the postnatal visit. Repeat testing was significantly associated with; Level of education (AOR=4.32,95%CI=1.57–11.87), marital status (AOR=10.51,95%CI=1.70–6.87), accompaniment by spouse (AOR=2.33, 95%CI=1.31 – 4.17), privacy of the counselling rooms AOR=5.10, 95%CI=0.32– 0.80) and waiting time before receiving clinic services AOR=0.31,95%CI=0.14– 0.68) and design of the book from IDI.

CONCLUSIONS AND RECOMMENDATIONS

Low levels of repeat HIV testing were observed among mothers attending perinatal clinics within Kisumu County. low education level, long waiting times, privacy of the rooms and design of the mother and child booklet were associated with it.

Mothers and health workers are to be educated on the benefits of repeat HIV testing during ANC and post-natal clinics.

Keywords: *Human Immunodeficiency Virus, Perinatal Clinics, HIV Prevalence, HIV Testing*

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Introduction

Children born to mothers who become HIV positive during pregnancy stand higher chances of getting mother-to-child transmission of the virus because of high viral loads associated with acute HIV infections from their mothers (1, 2). Reduced maternal immunity in both HIV-infected and uninfected women during pregnancy also increases the chances of HIV infection in the mother which then leads to mother and child infection (3) About 1.8 million children were

living with HIV by the end of 2017 globally. Out of which, 180,000 were reported as new infections.

The HIV testing during ANC visits starts from the first clinic visit followed by repeat testing which should be done in the 3rd trimester and during postnatal visits as per WHO recommendations (4, 5). Following these guidelines can help in ending or minimizing mother-to-child HIV transmissions to less than 2% (6).

As women with prevalent infection are increasingly identified at the first antenatal visit, it is estimated that 34 % of all MTCT in the future will be among women with incident infection after the first ANC clinic visit (7). Kisumu County has an HIV prevalence of 17.5%. This is much higher than the national HIV prevalence rate of 4.3% in Kenya (8). The WHO guidelines recommend that mothers continue to breastfeed exclusively up to 6 months to 1 year post-delivery. (9). This means there is still an increased risk of mother-to-child HIV transmission during the post-partum period. With the UNAIDS strategy of ending HIV/AIDS by 2030, there is a need to focus on zero new infections in children and taking care of the well-being of their mothers (10).

In a prospective study done in S. Africa, (11), repeat testers were found to be less likely than first-time testers to be HIV-infected. The median CD4 count was also higher among repeat testers than first-time testers. In addition, repeat testing was associated with those having family or friends living with HIV, females, self-referral, and those self-reporting very good health. Another study done in Uganda found repeat rapid HIV antibody testing to be a cost-effective strategy even in resource-limited settings (12). A cohort study in Malawi showed high acceptability of antenatal HIV testing at 90% in the antenatal period but with the challenge of high rates of loss to follow up (13). A study done in Zambia in a district hospital reported an overall repeat testing rate of 24% (14).

The WHO recommends that countries with high HIV prevalence like Kenya do repeat testing for HIV in the third trimester and during postnatal visits (15). According to the Ministry of Health (MOH) registers, many mothers did not receive repeat testing in Kisumu County despite the high prevalence of HIV in the area (16). We assessed the proportion of mothers going for repeat HIV testing and also examined associated factors with the uptake of repeat HIV testing.

Materials and methods

Study area

The study was conducted in two urban level 4 hospitals namely Lumumba and Migosi, and two rural hospitals namely Ahero level 4 Hospital and Chiga level 3 Hospital in Kisumu County. Kisumu County serves a population of 1,155,574 people out of which 574,609 (51%) were women. There are a total of 210 health facilities both private and public within Kisumu County.

Study design

This study was done in September 2019. A facility-based cross-sectional survey was used. Quantitative data was collected from mothers attending perinatal clinics while a qualitative IDI guide was used to collect data on the determinants of repeat HIV testing from healthcare workers.

Study population

The study was conducted among women of childbearing age and a selected number of health workers undertaking HIV counselling and testing in prenatal, maternity, and postnatal units. Mothers who attended both antenatal and postnatal visits in the four Sub-County Hospitals, had a mother and child booklet provided by the Kenya Ministry of Health and were residents of Kisumu county were included in the study. Mothers who were 18 years old and mothers who were legally allowed to sign informed consent before attaining national adulthood age of 18

years (emancipated minors) were also allowed to participate in the study. Women who were mentally handicapped were excluded.

Quantitative data sample size calculation

A sample size of 385 study participants was recruited to participate in the survey and an additional 39 were sampled to accommodate non-response. Cochran's formula ($N=Z^2PQ/d^2$) was applied considering the Z statistic at 95% CI (1.96), the prevalence of 50%, since there was no clear data on repeat testing rates in Kenya, and a 5% margin of error.

Qualitative data collection

Data was purposively collected from the healthcare workers who provide HTS and ANC services. There were 8 Key informant interviews.

Data collection instruments

Structured questionnaires were used to elicit information on demographic characteristics, individual determinants of repeat HIV testing, provider determinants, and facility determinants of repeat HIV testing. A mother and child booklet was used to confirm HIV testing dates and the number of repeat HIV tests. Qualitative data was collected by use of Key informant interviews with health workers doing HTC. The data collection tool for the KII consisted of an open-ended questionnaire which explored health workers' opinions on the current guidelines for HIV testing and factors hindering or promoting HIV testing among mothers attending perinatal clinics.

Reliability of the research instruments

To establish the reliability, re-testing of the instruments was done at a separate Sub County Hospital within Kisumu County. The reliability of the instruments was estimated using Cronbach's reliability coefficient.

Data analysis

The data analysis tool for Quantitative data was STATA version 14. Descriptive and binary logistic regression analyses were used to analyze quantitative data.

Ethical consideration

Ethical approval for the study was obtained from the Ethical Committee of JOOTRH and approval number ERC.IB/VOL. 1/598, and finally permission was obtained from Kisumu County Ministry of Health Ref: MOH/RAVOL2 (012). Written informed consent was obtained from participants.

Results

Demographic characteristics

This study involved 407 respondents who attended ANC and postnatal clinics at the 4 health facilities in Kisumu County as shown in Figure 1.

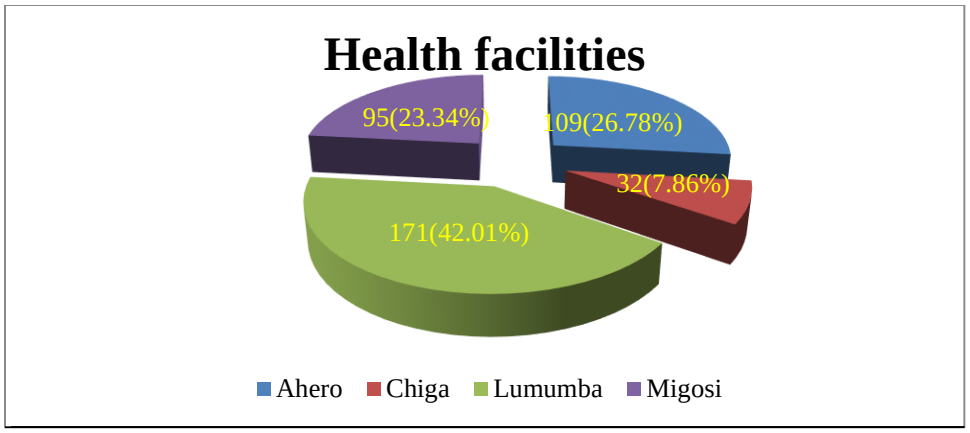

Figure 1:
Distribution of health facilities

According to the results in Table 1, the majority of the respondents (66.67%) were between 20 to 29 years of age, 7.41% were between 30 to 40 years old and 15.92% were below 20 years old. The mean and SD for the age of the respondents was 24.38±5.18 years. The majority of the respondents were married women.; 75.80% were married-monogamy, 4.94% were married-polygamy and 9.26% were single.

Table 1:
Sociodemographic characteristics of the respondents

Variable		Frequency	Per cent
Age in years (mean=24.38±5.18)	below 20	64	15.72
	20 to 29	268	65.85
	30 to 40	70	17.20
	Missing	5	1.23
Marital status	Married monogamy	307	75.43
	Married polygamy	20	4.91
	single	78	19.16
	Missing	2	0.49
Parity	0	108	26.54
	1	128	31.45
	2	95	23.34
	3	42	10.32
	4 and above	26	6.39
	Missing	8	1.97
Miscarriages	0	383	94.1
	1	12	2.95
	2	3	0.74
	Missing	9	2.21
Level of education	Primary	136	33.42
	Secondary	195	47.91
	College/University	74	18.18
	Missing	2	0.49
Religion	Catholic	110	27.03
	Protestant or other Christian	287	70.52
	Muslim	8	1.97
	Missing	2	0.49
Occupation	Formal	33	8.11
	Informal	151	37.10
	Student	2	0.49
	Not Employment	221	54.30
Monthly earnings	Less than 1000	91	22.36
	1000 to 5000	93	22.85
	5001 to 10000	64	15.72
	Over 10000	42	10.32
	Missing	117	28.75
Spouse's occupation	Formal	70	17.20
	Informal	276	67.81
	None	26	6.39
	Student	4	0.98
	Missing	31	7.62

Out of the 399 women who responded to the question of parity, 108 (27.07%) had never conceived before, 128 (32.08%) had conceived once, 95 (23.81%) had conceived twice before, 42 (10.52%) had conceived three times before and 26 (6.52%) of the women had conceived more than three times before. The majority of the respondents 383 (96.23%) had never had a miscarriage while 12 (3.02%) of them had had a miscarriage once and 3 (0.75%) of them had had a miscarriage two times Table 1 summarizes participant characteristics.

A total of 195 respondents (48.15%) had secondary education as the highest level, 136 (33.58%) had primary education as the highest level and 74 (18.27%) were educated up to college /university level. Out of 405 respondents who answered the question about religion, 287 (70.86%) were Protestants or other Christians, 110 (27.16%) were Catholics and 8 (1.98%) were Muslims.

Of the majority of the respondents, 221 (54.30%) were unemployed, 151 (37.10%) had informal jobs, 32 (8.11%) had formal jobs and 2 (0.47%) were students. The distribution of the monthly earnings shows that 91 (31.38%) of the respondents were earning less than Ksh.1000.00, 93 (32.07%) were earning between Ksh.1000.00 to Ksh.5000.00, 64 (22.07%) were earning between Ksh.5001.00 and Ksh.10000.00 while 42 (14.48%) were earning over Ksh.10000.00

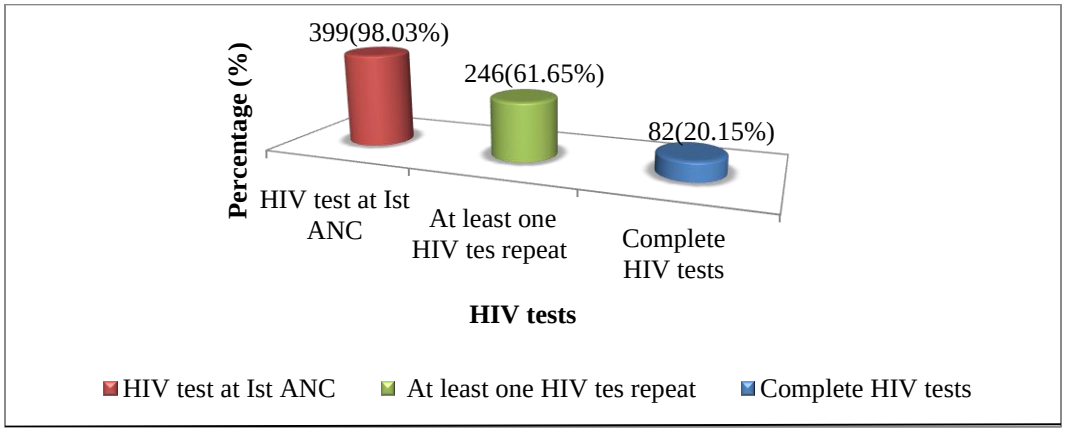

Figure 2:
Uptake of HIV test during perinatal period

Table 2:
The proportion of mothers getting repeat HIV testing by rural versus urban setup and age group

	HIV test at first ANC visit		At least one HIV test repeat		Complete HIV tests during all perinatal periods.	
	N	**% (95%CI)**	**N**	**% (95%CI)**	**N**	**% (95%CI)**
Overall	399	98.03(0.96-0.99)	246	61.65(0.57-0.66)	82	20.15(0.17-0.24)
Area						
Urban	263	98.87(0.98-0.99)	203	76.32(0.71-0.81)	74	27.82(0.23-0.34)
Rural	136	96.45(0.92-0.99)	43	32.33(0.25-0.41)	8	5.67 (0.03-0.11)
Age group						
Below 20	64	100	36	56.25(0.44- 0.68)	14	21.88(0.13-0.34)
20 - 29	260	97.01(0.94-0.99)	164	60.90(0.55-0.67)	51	19.03(0.15-0.24)
30+	70	100	46	71.88(0.60-0.82)	17	24.29(0.16-0.36)

CI=Confidence Interval

The proportion of mothers seeking repeat HIV testing in the perinatal period

While 399 participants received the first ANC HIV test (98.03%), only 82 (20.15%) received the full course of repeat HIV tests up to the postnatal visit. Those who received at least one repeat HIV test were 246 (61.65%) as shown in Figure 2.

The majority of the respondents were in the Urban area with the majority being aged between 20-29 years. Those living in urban were more likely to go for repeat HIV tests than those in rural setups as shown in Table 2.

Individual factors influencing repeat HIV testing in the perinatal period

Both bivariate and multivariate logistic regression analyses at a 5% significance level to determine factors associated with repeat HIV testing. The result in Table 3 shows that the odds of going for repeat HIV testing during the perinatal period were higher among participants with college/university level of education than those with primary level of education (AOR=4.32, 95%CI=1.57– 11.87, P-value=0.005). Single mothers were more likely to go for repeats of HIV testing as compared to married polygamy (p-value=0.014, AOR=10.51, 95%CI=1.70 – 6.87).

The result also shows that married-monogamy mothers were more likely to go for a repeat of HIV testing during the perinatal period as compared to married-polygamy (p-value=0.047, AOR=5.26, 95%CI=1.02 -12.06).

Table 3:
Individual factors associated with repeat HIV testing among mothers attending perinatal clinic in Kisumu County (N=407)

	Repeat HIV testing		Unadjusted model		Adjusted model	
Variables	**Yes; n (%)**	**No; n (%)**	**OR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Age in years						
<20	36 (56.25)	28 (43.75)	Ref	-	Ref	-
20 to 29	162 (60.90)	104 (39.10)	1.22(0.706 – 2.102)	0.479	1.06 (0.46 – 2.46)	0.876
30 to 40	46 (71.88)	18 (28.13)	0.75(0.380 – 1.491)	0.415	0.64 (0.23 – 1.79)	0.395
Level of Education						
Primary	74 (56.06)	58 (43.94)	Ref	-	Ref	-
Secondary	122 (63.21)	71 (36.79)	1.11 (0.72 – 1.73)	0.631	1.02 (0.56 – 1.87)	0.921
College/University	50 (67.57)	24 (32.43)	3.77 (1.99– 7.14)	<0.001	4.32 (1.57– 11.87)	0.005
Marital Status						
Single	46 (60.53)	30 (39.47)	4.21 (1.29 – 13.73)	0.010	10.51(1.70 – 6.87)	0.014
Married-Monogamy	189 (62.38)	114 (37.62)	4.35 (1.42 – 13.32)	0.017	5.26(1.02 - 12.06)	0.047
Married-Polygamy	11 (61.11)	7 (38.89)	Ref	-	Ref	-
Monthly income in Ksh						
< 1000	31 (35.63)	56 (64.37)	Ref	-	Ref	-
1000 to 5000	58 (62.37)	35 (37.63)	0.72 (0.40 – 1.30)	0.280	0.57 (0.29 – 1.13)	0.110
5001 to 10000	50 (80.65)	12 (19.35)	0.50 (0.26 – 0.96)	0.038	0.38 (0.17 – 0.84)	0.016
> 10000	36 (85.71)	6 (14.29)	0.69 (0.33 – 1.45)	0.325	0.40 (0.14 -1.10)	0.076
Accompanied by spouse						
Yes	100 (62.11)	61 (37.89)	1.61 (1.06 – 2.45)	0.025	2.33 (1.31 – 4.17)	0.004
No	119 (60.71)	77 (39.29)	Ref	-	Ref	-
No spouse	22 (66.67)	11 (33.33)	0.85 (0.40 – 1.78)	0.664	0.34 (0.10 - 1.17)	0.088

Ref=Reference category; OR= odds ratio; CI=confidence interval; AOR=adjusted odds ratio

Mothers who were earning between Ksh.5001 to Ksh.10000 per month were less likely to go for repeats of HIV testing as compared to mothers whose salaries were less than Ksh.1000 per month (p-value=0.016, AOR=0.38, 95%CI=0.17 – 0.84). Participants who were accompanied by their spouses to the clinic were found to be more likely to go for repeat HIV testing as compared to those who were not accompanied by their spouses (P-value= 0.004, AOR=2.33, 95%CI=1.31 – 4.17).

Individual factors were the most mentioned in the qualitative data as was reported by respondents. Some of the main responses included assertiveness and giving the right information by health workers on the need for repeat tests and giving information on when the test should be done. These were some of the responses.

"You know like once you have attended to that woman for the first time there Is that relationship you create like she is now familiar to you, she is not worried, if she has something to share with you, not like the first time she is just open." [ANC_Nurse _Lumumba]

"As we tell them that there are drugs, ARV which can prevent them from infecting their unborn babies if the detection is realized early, so they know that in case they test positive there is still hope for getting a negative baby" [ANC_Nurse_Lumumba]

Individual factors such as Noncompliance by partners and lack of knowledge on the reason for doing repeat HIV tests were the major factors that were identified as hindering factors as per report by some key informants in the interviews. One of them stated as follows:

"They don't understand the connection of ARVS in relationship to prevention of HIV" [ANC Nurse Lumumba]

Facility-based factors influencing repeat HIV testing in the perinatal period

Table four shows that the privacy of the room and waiting time were statistically significant factors associated with repeat HIV testing during the perinatal period.

Table 4:
Health facility factors associated with repeat HIV testing among mothers attending perinatal clinic in Kisumu County (N=407)

	Repeat HIV testing		Unadjusted model		Adjusted model	
Factors	**Yes; n (%)**	**No; n (%)**	**OR (95% CI)**	**P-value**	**AOR (95% CI)**	**P-value**
Privacy of the room						
Not satisfied	20 (60.61)	13 (39.39)	0.14 (0.02 – 1.28)	0.081	0.28(0.03– 2.73)	0.273
Just satisfied	102 (53.68)	88 (46.32)	Ref	-	Ref	-
Very satisfied	123 (70.29)	52 (29.71)	4.50 (0.29 – 0.70)	<0.001	5.10(0.32– 0.80)	0.003
Waiting time						
Less than 30 min	113 (64.94)	61 (35.06)	Ref	-	Ref	
30 min to 1hr	105 (57.38)	78 (42.62)	0.58 (0.38 – 0.89)	0.012	0.66(0.42– 1.01)	0.057
More than 1 hr.	27 (71.05)	11 (28.95)	0.23 (0.11 – 0.49)	<0.001	0.31(0.14– 0.68)	0.003
The cost incurred during a clinic visit						
No	240 (62.18)	146 (37.82)	Ref	-	Ref	-
Yes	6 (46.15)	7 (53.85)	1.57 (0.50 – 4.88)	0.437	1.41(0.42– 4.71)	0.575
Distance to the hospital						
Far	66 (62.26)	40 (37.74)	Ref	-	Ref	-
Near	180 (61.43)	113 (38.57)	1.42 (0.91 – 2.20)	0.121	1.31(0.81– 2.11)	0.275

Ref=Reference category; OR= Odds ratio; CI=confidence interval; AOR=adjusted odds ratio

In the unadjusted logistic regression model, participants who were very satisfied with the privacy were 4.50 times more likely to go for repeat HIV testing as compared to participants who were just satisfied (95%CI=0.29 – 0.70, P-value= <0.001). Participants who waited for 30 minutes to 1 hour at the health facility were 0.58 times less likely to go for repeat HIV testing as compared to those who waited for less than 30 minutes (95%CI=0.38 – 0.89, P-value=0.012). The odds of going for repeat HIV testing were found to be less for a participant who waited for more than 1 hour at the health facility as compared to one who waited for less than 30 minutes (OR = 0.23, 95%CI=0.11 – 0.49).

In multivariate analysis, participants who were very satisfied with the privacy of the consultation room were found to be 5.1 times more likely to go for a repeat HIV test as compared to participants who were just satisfied (95%CI=0.32– 0.80, P-value=0.003). Waiting time at the facility before getting medical service was significantly associated with repeat HIV testing during perinatal care, participants who were waiting for more than one hour were 0.31 times less likely to go for repeat HIV testing as compared to those who were waiting for less than 30 minutes (95%CI=0.14– 0.68, P-Value= 0.003)

From the key informant interviews, understaffing, industrial actions by Nurses and booklet design were some of the barriers to attaining the required standards of repeat HIV testing. These were some of the responses:

"We understand that the facilities are not so much active in terms of staffing because of the on and off strikes…. It makes the follow-up and care to this kind of population, the ANC mothers, look like a big challenge." [Nurse, Lumumba]

"The mother and child booklet given by MOH also doesn't provide dates for repeat tests. It is just a page. "Also, there are some who wish that the test should be done in the presence of the partners and the partners don't always accompany the clients to the clinic" [ANC Nurse, Lumumba]

Knowledge of facility staff on Current guidelines on perinatal repeat HIV testing

From the respondents, it was established that there are clear guidelines as to how pregnant mothers are supposed to undertake HIV testing with one of the ANC Nurses reacting to the recommendations as follows.

"We first test the mothers when they come for their first visit or the antenatal clinic at first contact. Then we repeat when the mother is 28 weeks, that's the third trimester, and then the next series of tests are done during delivery and after delivery when the mother brings the baby at six weeks. Thereafter, tests are done every six months until the mother stops breastfeeding." [Lumumba Hospital ANC Nurse]

Compliance with current guidelines by facility staff

Under compliance with the current recommendations, most respondents alluded that the set guidelines are being followed except for one who felt that there was still a bit of challenges in implementing the same.

"We are following it to the letter because if you mess, if you follow your guidelines, the Ministry of Health will be on your neck and of course they tend to offer the best services that they can." [ANC Nurse AHERO]

The respondents who felt there were facility challenges in following the guidelines had the following comments;

"I don't think they are followed, yes there are some loopholes…. So in most cases, you have so many clients you don't even take time to check whether this client is eligible because you are focused on clearing the queue when the workload is too much. In such a case you will not even concentrate, and you will not remember to talk to this mother about their HIV status, you

only remember after they have gone, 'Ooh, I forgot to send that client for HIV testing, So the workload is the problem." [MCH-FP Nurse Chiga]

Facility challenges to current recommendation guidelines

The challenges facing the current recommendations for perinatal HIV testing were subdivided into three factors of interest that is, Facility factors, Individual factors and Provider factors. Individual factors which included financial constraints, ignorance of the recommended guidelines and noncompliance from partners were recorded as the major challenges as compared to Facility and Provider factors:

"Some tend to think that these services are very expensive not knowing that we have medical finance services like Linda Mama which pays for the ANC services and delivery services". [ANC Nurse Migosi]

"… a client can come in the third trimester, there is maybe the myths and misconceptions back in the villages, maybe some of them claim that if you start your clinic earlier you are likely to be given a lot of drugs that are going to mess with the outcome; that is, you are going to have a child with anomalies." [ANC Nurse Lumumba]

Discussion

The proportion of mothers who met the requirement for repeat HIV testing from ANC to post-natal visits was (20.15%). This is very low in comparison to the projected target for all mothers attending clinics to have repeat HIV tests routinely up to postnatal visits.

Being educated was significantly associated with having repeat HIV tests. A Demographic Health Survey (DHS) in Zambia among women of childbearing age concurred that educational attainment was strongly associated with HIV testing among women attending perinatal clinics (17). Another finding was that among married women, those accompanied by their spouses to the clinics were more likely to go for repeat HIV testing. This is in agreement with another study indicating that pregnant women desire men to accompany them to the clinic as this is a sign of protection, caring and love (18).

Participants in key informant interviews reported facility barriers such as strikes, understaffing and the booklet design. It was reported that from the design of the book, the HIV test page doesn't indicate when to do subsequent tests and it was left to the health worker's discretion to know when repeat tests should be done. Health workers face the challenge of scheduling repeat tests for mothers during clinic visits. Other barriers to repeat HIV testing were distance from the health facility and privacy of the rooms.

Limitations

The results of the study may not be generalized to the rest of the country since the study was carried out only in one county. Secondly, the study was carried out at one point in time. This could only measure the prevalence of repeat HIV testing and therefore may not reflect the seasonal variations. However, the results would help identify the causes of most missed opportunities for repeat testing.

Conclusion and recommendations

The rate of repeat HIV testing during the perinatal period in Kisumu County is still very low, especially at postnatal visits. Mothers should be educated on the importance of early and regular clinic visits, including HIV testing throughout the prenatal and postnatal periods. Mother and child ANC book should be revised to indicate specific times for repeat testing to act as a reminder.

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