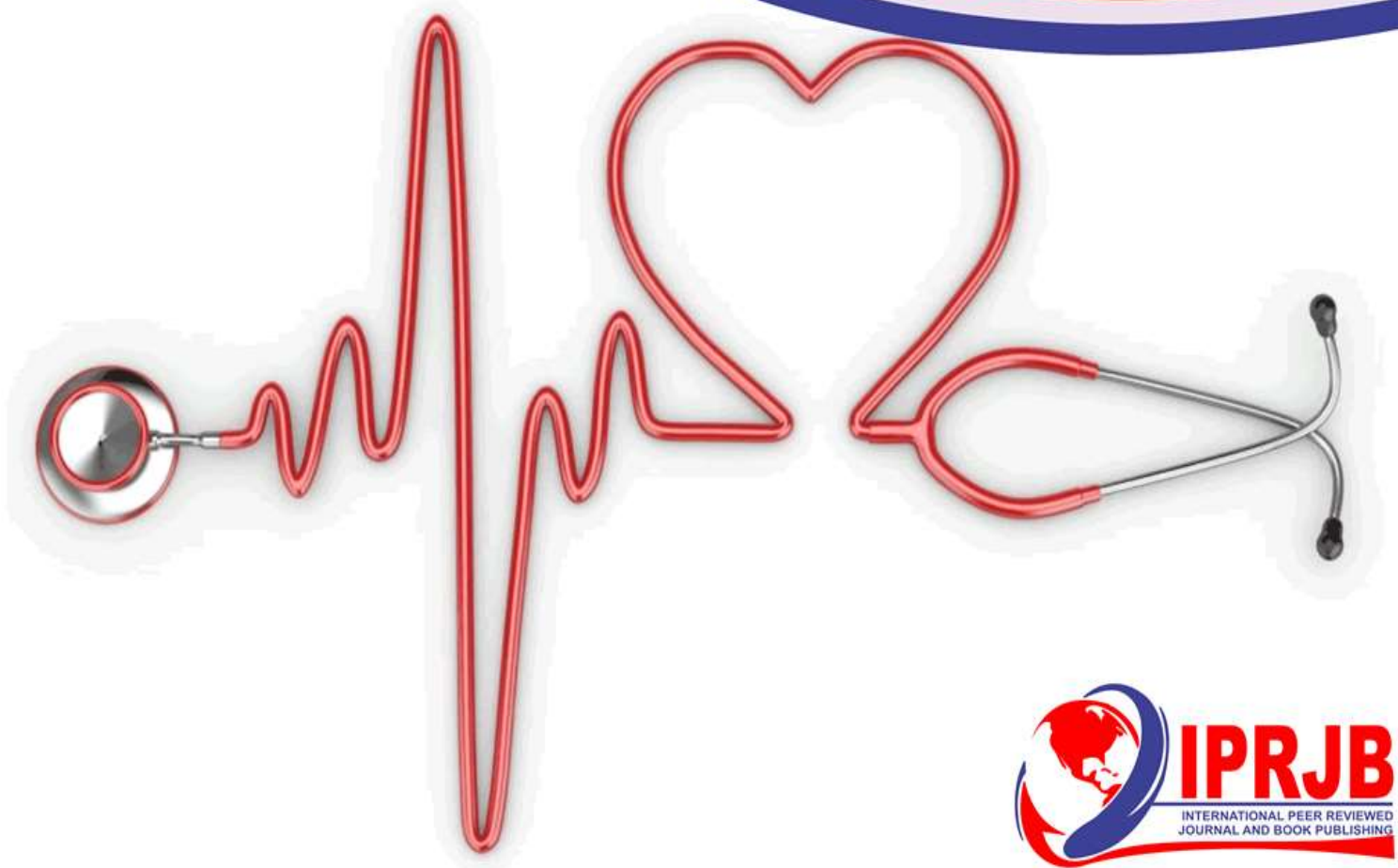


# Journal of Health, Medicine and Nursing (JHMN)

## **Health System-Related Factors that Influence Retention in Care among HIV Infected Pregnant Women in Narok County, Kenya**

Jackline Gakii, Dr. Nelson Menza, PhD. and Dr. Winfreda Nyamota Maoga, PhD.



**Health System-Related Factors that Influence Retention in Care among HIV Infected Pregnant Women in Narok County, Kenya**



<sup>1\*</sup>Jackline Gakii

School of Public Health and Applied Human Sciences,  
Kenyatta University



<sup>2</sup>Dr. Nelson Menza, PhD.

Department of Medical Laboratory Sciences, Kenyatta  
University



<sup>3</sup>Dr. Winfreda Nyamota Maoga, PhD.

Department of Food Nutrition & Dietetics, Kenyatta  
University

**Article History**

*Received 19<sup>th</sup> March 2024*

*Received in Revised Form 17<sup>th</sup> April 2024*

*Accepted 16<sup>th</sup> May 2024*



How to cite in APA format:

Gakii , J., Menza, N., & Maoga, W. (2024). Health System-Related Factors that Influence Retention in Care among HIV Infected Pregnant Women in Narok County, Kenya. *Journal of Health, Medicine and Nursing*, 10(2), 58–69. <https://doi.org/10.47604/jhmn.2559>

**Abstract**

**Purpose:** The aim of the study was to establish the health system-related factors that influence retention in care among HIV infected pregnant women in Narok County, Kenya.

**Methodology:** The study adopted a cross-sectional mixed method design. Purposive sampling method was used to sample the required sample size of 117 HIV infected pregnant women, the participants of the Focus Group Discussions (FGD) and Key Informant Interviews (KII). The study was carried out at Narok County Referral and all the sub-county hospitals in Narok County. A structured questionnaire was used to collect quantitative data. Focus group discussion and KII guides were used to collect qualitative data. Quantitative and qualitative data was analyzed using SPSS version 21 and Nvivo version 14 respectively. Chi square test and logistic regression analysis were used to determine the health system-related factors that influence retention in HIV care. Thematic content analysis was done for qualitative data. The mean age of participants was 30 years (SD=6.48). The study results generated were presented in bar graphs and tables for quantitative data. Results were presented as narrations and triangulated with qualitative data.

**Findings:** This study established that health system-related factors (waiting time, health care workers services and ARV availability) influenced retention in care among HIV infected pregnant women. However, only ARV availability had a significant association with retention in care ( $P<0.001$ , OR=0.19). The multiple logistic regression was used to predict the influence of grouped variables. Overall, the model was a significant predictor of retention in care. Health system related factors was found to increase the likelihood of being retained in care (OR=5.14), though not significant predictors of retention in care ( $P<0.34$ ).

**Unique Contribution to Theory, Practice and Policy:** Health system-related factors particularly ARV drug stocks, healthcare workers staffing and timely access of services should be strengthened in order to avert stock outs, minimize waiting time and follow up patients who miss clinic appointments to increase retention among pregnant women in HIV care. Advocate for policy reforms aimed at addressing structural barriers to retention in care, including increased investment in healthcare infrastructure, workforce capacity building, and integration of HIV services within maternal and child health programs. By aligning policy initiatives with the unique needs of HIV-infected pregnant women, policymakers can foster an enabling environment for retention in care, ultimately contributing to the achievement of national and global HIV/AIDS targets.

**Keywords:** *Health System-Related Factors, Retention in care, HIV Infected Pregnant Women*

©2024 by the Authors. This Article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0>)

## INTRODUCTION

Health System-Related Factors play a critical role in influencing retention in care among HIV-infected pregnant women. Accessibility to healthcare facilities is pivotal; proximity to clinics offering antiretroviral therapy (ART) and prenatal care significantly affects retention rates. According to a study by Rosenberg *et al.* (2017), pregnant women with easier access to healthcare services are more likely to remain engaged in HIV care throughout their pregnancy. Additionally, the availability of comprehensive services within healthcare settings, such as HIV testing, counseling, and maternal health services, can enhance retention by addressing multiple needs simultaneously (Gichane *et al.*, 2019).

The quality of care provided by healthcare professionals profoundly impacts retention in care. A supportive and non-discriminatory environment fosters trust and encourages pregnant women to continue seeking care. Studies have shown that respectful treatment from healthcare providers positively correlates with retention in HIV care among pregnant women (Ebuy *et al.*, 2020). Furthermore, effective communication between healthcare providers and patients is essential for ensuring understanding of treatment regimens, addressing concerns, and promoting adherence to ART, all of which contribute to sustained engagement in care (Nachega *et al.*, 2014).

The expected expansion of Prevention of Mother to Child Transmission of HIV/AIDS (PMTCT) services on the Sub-continent has been faced with less than satisfactory utilization (Shigdel *et al.*, 2014). Retention remains an important programmatic challenge in fighting HIV among pregnant women. While numerous patient-level factors have been associated with loss to follow-up (LTFU), less is known about health system factors (Rachlis *et al.*, 2016). Patients are driven away from a particular facility, either because of access to the facility or experiences at that facility (Geng *et al.*, 2016). In their study on effect of healthcare facilities on retention of care for women in Philippines, Oetzel *et al.*, (2015), observed that inadequate healthcare facilities especially congested consultation areas and pharmacies.

They therefore concluded that health facility delivery and term delivery was also linked with maternal adherence and retention in a cross-sectional study conducted. In addition, long waiting times, poor counseling due to short contact time between health care providers and women all impacted negatively on the ability of mothers to continue and adhere to ART in Brazzille (Itoua *et al.*, 2015). Lack of privacy and not trusting health workers to keep women's HIV status confidential were cited by many women as reasons for not continuing ART.

An enabling environment is required to support retention in care through stigma reduction, strengthened capacity to provide, support and promote linkages and access to prevention, care and support (WHO, 2011). High patient load at health facilities may also result in long clinic appointments, long waiting times often lasting almost the whole day, poor staff attitudes and decreased quality of patient-provider interaction as well as overall patient dissatisfaction in their HIV care can lead to frustrations with most patients not returning to the clinic (Alamo *et al.*, 2013). Similarly, a study done in Tanzania found that stock-outs of HIV-related medication and supplies, traveling long distances for care only to be turned away if they arrived outside of clinic hours and if providers were too busy to serve them led to frustration. This also led to decreased trust in the health system, promoted disengagement from care and led to poor health outcomes (Layer *et al.*, 2014). In a qualitative study stigma associated with HIV care facilities contributed to poor linkage and retention rates. This was further facilitated by the lack of

centralized healthcare services requiring HIV patients to seek care in specific HIV stigmatized clinics. Stigma associated with the health facility, delays in service delivery, long queues, frequency of clinic visits for follow-up care, poor health provider's attitudes and lack of confidentiality among health providers was contributing to poor retention (Wachira *et al.*, 2014). In Uganda, health service providers' attitudes and low ART stock levels are some of the factors that hinder retention in HIV care (Muhumuza, 2017).

During focus groups and interviews conducted in Lesotho, poor interaction with health workers was identified as a major barrier to engagement in care (Koto & Maharaj, 2016). Poor interactions included disrespectful behaviors such as shouting and making rude comments. Nevertheless, qualitative research has also described the negative impact of health care workers' attitude and behavior on the ability of women to initiate, adhere and continue ART. Focus groups conducted in Kenya revealed that mistreatment by midwives was one of the reasons women reported difficulties in the use of zidovudine (Omonaiye *et al.*, 2016). Women feared that midwives would not provide the required assistance during delivery if they knew their HIV infection status.

National data show that retention among all people living with HIV and known to be on ART is 81% at 12 months, 73% at 24 months and 65% at 60 months (NACC, 2016). It has been reported that the ART retention in Narok County is about 65% (NACC, 2016). This is far lower than the national retention percentage. Information about the cause of this low retention in Narok County is limited. Maternal to child transmission (MTCT) rate in Narok County is estimated to be 16.8% which is far above the national level of 11.5% (NACC, 2018). Treatment drop-out rates among HIV infected pregnant remain high, leading to increased risk of transmission to their children. Identification of predictors of retention can facilitate the development of specific interventions that might ensure higher retention and therefore maximize the benefits of treatment and minimize viral transmission.

### **Statement of the Problem**

Retention in care for HIV infected pregnant women remain a challenge in Kenya. Data available shows that once linked to HIV care a substantial portion of people living with HIV, approximately 19% at 12 months, 27% at 24 months and 35% at 60 months do not adequately attend to ART services in the recommended intervals (NACC, 2016). Pregnant women have a lower likelihood of being retained in care than non-pregnant women (Gwynn *et al.*, 2015). Statistics from Ministry of Health (MOH) show that less than 65% of HIV infected pregnant women are retained on ART care. This is below the national retention which is 81% (MOH, 2016). As a result, the risk of maternal-to-child transmission in Narok County is still high. Despite measures and efforts by several stakeholders in HIV prevention, care and treatment to increase retention to ART care, retention among pregnant women in Narok County is still very low at 65%. It is against this information that the study sought to determine the health system-related factors that influence retention in care among HIV positive pregnant women in Narok County, Kenya.

The Ministry of Health (MOH) records show that only 65% of HIV infected pregnant women in Narok County are retained in ART care, with MTCT rate estimated to be as high as 16.8% (NACC, 2018). The choice of Sub-County Hospitals as study sites was guided by the fact that these catchment areas have the highest population of people as well as HIV infected pregnant women in Narok County. The hospitals offer a wide range of clinical and preventive services



and thus attracts many HIV infected pregnant seeking services from the facilities, hence another reason for the choice of the study sites. Failure to retain pregnant women in HIV care impede attainment of Sustainable Development Goal 3.1 which aims to reduce maternal mortality ratio to less than 70 maternal deaths per 100,000 live births and and MOH targets by reducing maternal mortality to 150 deaths/100000 by 2030 of which Kenya is a signatory (UN, 2015; MOH, 2016). As the PMTCT services are being rolled out to eliminate mother-to-child transmission (EMTCT) there is limited documented data on the predictors of retention on ART among HIV infected pregnant women. Therefore, this study will help find out the predictors of retention in care among HIV infected pregnant women and enable us find possible ways to improve ART retention in Narok County. It's believed that implementation of the research findings may contribute towards improving the retention to ART care as well as adherence among HIV infected pregnant women.

### **Research Gaps**

Retention is important in the elimination of mother to child transmission of HIV, maternal wellbeing and in prevention of horizontal transmission of HIV. Poor retention in care among pregnant women presents a major challenge in EMTCT programs. Conceptually, the reviewed studies showed inconsistent results regarding the effects health system related factors on retention in HIV care during pregnancy. Therefore, there was need for further study to address these concerns. Identification of predictors of retention in care is an important process in reviewing the current EMTCT strategies aimed at sustaining long-term retention in care. Besides, no study has been conducted in this area at the geographical scope of the current study. Coupled with the contradictions, inconsistencies and in conclusions, the current study seeks to fill the conceptual and contextual gaps by carrying out a study on to establish the health system-related factors that influence retention in care among HIV infected pregnant women in Narok County.

### **METHODOLOGY**

The study adopted cross-sectional mixed method design. The study location was Narok County in the southern part in the Great Rift Valley. The area was selected because of the low retention rate of 65% against the national rate of 81% leading to high maternal to child transmission of HIV of 16.8% against a national level of 11.5% (MOH, 2016; NACC, 2018). Purposive sampling which is non-probability technique was used to select the required sample of study participants from the population. The sample size was 117 HIV infected pregnant women receiving EMTCT services at Narok County Referral and all the sub-county hospitals in Narok County. Structured questionnaires were used to collect data from 117 HIV infected pregnant women. The questionnaire had both open and closed ended type of questions. Qualitative data was collected using the Focus Group Discussion (FGD) guides and Key Informant Interview (KII). Quantitative analysis of data was performed using SPSS version 21. Thematic content analysis was used to identify key issues based on an inductive and deductive approach for qualitative data. The study results generated were presented in bar graphs and tables for quantitative data. Results were presented as narrations and triangulated with qualitative data.

## RESULTS AND DISCUSSION

### Health System Related Factors That Influence Retention in Care among HIV Infected Pregnant Women in Narok County

#### Waiting Time

Majority of respondents (80%) said that the waiting time during a follow up visit was less than one hour, 17% between 1-2 hours while 3% reported 2-3 hours. The odds of being retained in care reduced with the increase in waiting time; 1-2 hours and 2-3 hours with Odds ratio of 1.2 and 0.25 respectively. The Chi square statistic indicates statistically insignificant association between waiting time during a follow up ( $P=0.670$ ,  $\chi^2=10.310$ ,  $OR=1.27$ ) and retention in care among human immunodeficiency virus infected pregnant women. Waiting time during a follow up and retention in care among human immunodeficiency virus infected pregnant women have statistically significant relationship,  $P<0.05$  as shown in Table 1 below.

**Table 1: Waiting Time at PMTCT Clinic**

Characteristic	Frequency (n)	Percent	Sig.
<b>Waiting Time</b>			
1-2 hours	20	17.09	$\chi^2=10.310$ df=4 $P=0.670$
2-3 hours	3	2.56	
Less than 1 hour	94	80.34	
<b>Retention</b>			
	<b>Odds Ratio</b>	<b>P Value</b>	<b>95% Confidence Interval</b>
			<b>Lower</b> <b>Upper</b>
<b>Waiting Time</b>			
Less than 1 hour	Reference		
1-2 hours	1.27	0.67	0.43      3.77
2-3 hours	0.25	0.27	0.021      2.88

Key Informant Interview I indicated; “There is enough staff in the facility. It takes not more than ten minutes to serve a patient”. Key Informant II indicated; “The staffing of the health center is good. I always take like 45mins to 1 hour. The facility has an active support group for HIV+ pregnant women. However, in some occasions there are stock outs. Another Key informant indicated; “In our clinic, the antenatal clinic and PMTCT are integrated. In the PMTCT clinic, pregnant mothers will take less than 20 minutes to get attended”.

#### Patient-Provider Relationship

Ninety-three percent (109) said that health care workers (HCWs) usually handle them well every time they go for HCW Care while 7% (8) said that it was fair, depended with the health worker as shown in Table 2 below. The chi square statistic indicates statistically insignificant association between HCW Care ( $P=0.270$ ,  $\chi^2=13.804$ ,  $OR=.500$ ) and retention in care among human immunodeficiency virus infected pregnant women. Health care worker care and retention in care among human immunodeficiency virus infected pregnant women have statistically significant relationship,  $P<0.05$ .

During FGD one participant said, “Through HCW Care, you can get tested, counseled on self-acceptance”. Another FGD indicated, “If you have a problem the nurse may help you in counseling session and sometimes when they have transport, they help us”.

Similarly, another participant indicated, “The nurse will help you on how you will live. We are given medication to improve your immunity. You are taught on how you improve eating well. Other programs like ‘Linda mama’ help cover you even when the child will become sick since they are free”.

“Every month when we come for drug refill the nurse reminds us on how to take the medicine without missing them”.

**Table 2: Patient-Provider relationship at EMTCT clinic**

Characteristic	Frequency (n)	Percent	Sig.
<b>HCWs handling of patients</b>			$\chi^2=13.804$
Fair, depends with health worker	8	6.84	df=5
Good	109	93.16	$P=0.270$
<b>Retention</b>	<b>Odds Ratio</b>	<b>P Value</b>	<b>95% Confidence Interval</b>
			<b>Lower</b> <b>Upper</b>
<b>HCW Services</b>	0.5	0.39	0.10      2.44

### Availability of Drugs

In terms of availability of ARVs at the healthy facility, 78% (91) had never missed while 22% (26) had ever missed ARVs at the health facility as shown in Table 3 below. The chi square statistic indicates statistically significant relationship between missing ARVs at the health facility ( $P=0.001$ ,  $\chi^2=11.193$ ,  $OR=.190$ ) and retention in care among human immunodeficiency virus infected pregnant women. Missing ARVs at the health facility and retention in care among human immunodeficiency virus infected pregnant women have statistical significant relationship,  $P<0.05$ .

**Table 3: Availability of Drugs at EMTCT Clinic**

Characteristic	Frequency (n)	Percent	Sig.
<b>ARVs availability at the health facility</b>			$\chi^2=11.193$
No	91	77.78	df=3
Yes	26	22.22	$P=0.001^*$
<b>Retention</b>	<b>Odds Ratio</b>	<b>P Value</b>	<b>95% Confidence Interval</b>
			<b>Lower</b> <b>Upper</b>
<b>ARVs Availability</b>	0.19	0.001*	0.07      0.52

### Proportion of Retention in HIV Care

The proportion of retention in HIV care was 79%, while 21% had not been retained in care as shown in figure 2 below.

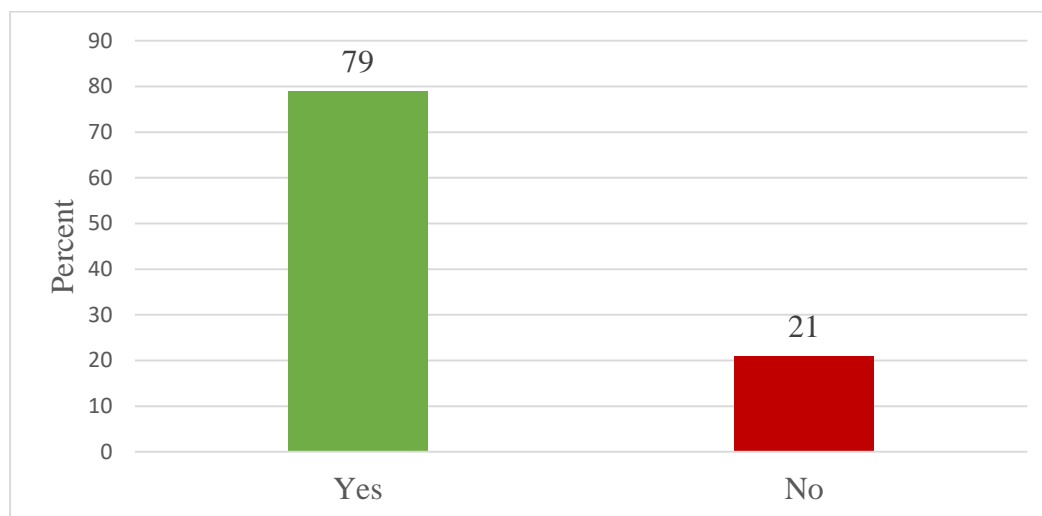


Figure 1: Proportion of Retention in HIV Care

Of the 21% who were not retained in care, 8.4% (10) cited lack of transport/Distance, having extra pills 5.88% (7), stigma and disclosure issues 3.36% (4), forgot to take ARV 2.52% (3) while other factors included pill burden, too busy and religious beliefs as shown in Table 4.

Table 4: Reasons for Non-Retention in HIV Care

Characteristic	Frequency	Percent
<b>Reason for non-retention in HIV care (n=25)</b>		
Forgot to take ARV	3	2.52
Lack of transport fare/Distance	10	8.4
Illness	1	0.84
Pill Burden	2	1.68
Too busy	1	0.84
I was using traditional medicine	1	0.84
Stigma and disclosure issues	4	3.36
I was not happy with services in this clinic	1	0.84
Religious beliefs	1	0.84
Extra pills	7	5.88
Others	3	2.52

On the challenges encountered in accessing ART services, commodities and being retained in care, women had varied responses. The most FGD participants indicated that poor transport infrastructure, distance to the health facilities, among other factors as the main health system-related factors affecting retention in care.

*“I cannot access ART services because of inaccessible mode of transport especially during rainy seasons. It is also a problem to access ART services especially when health officers are on strike”* (FGD participant).

*“I live far away from hospital. And this makes me miss the PMTCT”* (FGD participant).

*“At time, some of us live far away from the hospital and occasionally lack transport. Occasionally, some mothers live far away and are unable to access quick transport.”* (FGD participant).



Key Informants supported the sentiments echoed by women on the difficulties encountered in accessing ART services, commodities and being retained in care; *“When providing care for the HIV pregnant women, some women miss to come for PMTCT care for lack funds for transport to come to the facility. There is also ignorance, when you give a patient an appointment date the client may decide to skip”*. (PMTCT Nurse during a KII):

*“There is stigma and denial by the patient, they also have financial constrains whereby some of them may not have money for transport to travel to the clinic especially during poor weather”*. - (Key Informant)

### Defaulter Tracing Mechanism

On the health care provider contact after missing a EMTCT visit, 13.44% indicated that they were called, 5.88% were not contacted while 1.68% were visited at home (Table 5).

**Table 5: Defaulter Contact by Healthcare Workers**

Characteristic	Frequency	Percent
<b>Health Care Contact after missing EMTCT visit (n=25)</b>		
I was called.	16	13.44
Not contacted	7	5.88
They visited me at home	2	1.68

Key Informant indicated;

*“On the defaulter tracing mechanism, we do physical tracing and we also call them. We contact them by calling them”*.

Another key informant indicated;

*“There is default tracing mechanisms. We have community health workers and volunteers who link the patient from the community to the facility. We also have a HIV testing counselor who tests the patient at the facility and links him or her to the clinician. We also have a mentor mother who does the follow up of the patient and checks on adherence”*.

Further another Key Informant echoed the other two KIIs:

*“There is default tracing mechanisms. We have a nurse stationed at the PMTCT. We have a phone which is throughout loaded with credit, we also have a defaulter tracking register where when a person misses appointment we record in the defaulter tracking register then using the phone we call a client. It is done by the mentor mother and adherence counsellor. We link with community health extension workers and community health volunteers so that they can trace the client and bring back to us”*.

### Health System-Related Factors Influence on Retention in Care among HIV Infected Pregnant Women in Narok County

The study found that grouped health system-related factors variables (waiting time, Health care workers (HCW) services and ARV availability) have little influence on retention. Overall, the multiple logistic regression model was a significant predictor of retention in care ( $X^2(9) = 29.29$ ,  $P = 0.0006$ , Nagelkerke  $R^2 = 0.5834$ ). Health system-related factors ( $OR = 5.14$ ,  $P = 0.34$ ) were found not to be significant predictors of retention in care. Table 6 below summarizes the logistic regression analysis results. Results showed that the p-value for health system-related factors was 0.34. This indicated that the null hypothesis was accepted hence there is no a

significant association between health system-related factors and retention in care among HIV infected pregnant women in Narok County.

**Table 6: Regression Model for Effect of Health System-Related Factors on Retention in Care among HIV Infected Pregnant Women in Narok County**

Retention	$\beta$	Odds Ratio	95% Confidence Interval		P Value
			Lower	Upper	
Health system-related factors	0.96	5.14	0.18	145.98	0.34

## DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

### Discussion

#### Health System Related Factors That Influence Retention in Care

This study established that health system related factors were found not to be significant predictors of retention in care ( $P=0.34$ ). However, some individual health system related factors namely waiting time, Health care workers (HCW) services and ARV availability influenced retention in care among HIV+ pregnant women. However, only ARV availability had a significant association with retention in care ( $P=0.001$ ). According to WHO, an enabling environment is required to support retention in care through stigma reduction, strengthened capacity to provide, support and promote linkages and access to prevention, care and support (WHO, 2011). Health facilities play a very big role in creating a conducive environment that supports retention in care. Findings from this study support those of Alamo *et al.* (2013) who found that long waiting times, poor staff attitudes and decreased quality of patient-provider interaction as well as overall patient dissatisfaction in their HIV care led to frustrations with most patients not returning to the clinic hence leading to non-retention.

Health care workers good rapport (treatment) with patients, availability of drugs, waiting times and defaulter follow up by health facilities were key themes identified by women as health system-related that influenced retention in care. Women mentioned that they attended the clinics as scheduled when HCWs had a good rapport with them during clinic days and the waiting time at the clinic was short. They also indicated they honoured clinic appointments when they were certain that they will get prescribed drugs at the health pharmacy, and were reminded of their appointments whenever they missed. This study's findings supports those of Wachira *et al.* (2014) who found that delays at the clinic, long queues, favoritism, health provider's attitudes, poor provider-patient communication, and lack of confidentiality among health providers was contributing to poor retention.

### Conclusions

Antiretroviral therapy availability and defaulter tracing mechanism at the health facility positively influences retention in care among HIV infected pregnant women and are the main predicators in care among HIV infected pregnant women of the health system-related.

### Recommendations

Health system-related factors particularly ARV drug stocks, healthcare workers staffing and defaulter tracing mechanisms should be strengthened in order to avert stock outs, minimize waiting time and follow up patients who miss clinic appointments to increase retention among pregnant women in HIV care.

### **Theory**

Conduct a comprehensive analysis of health system-related factors affecting retention in care among HIV-infected pregnant women in Narok County, drawing upon theoretical frameworks such as the Andersen Behavioral Model of Health Services Use. This will provide a theoretical foundation for understanding how factors such as healthcare accessibility, availability, affordability, and acceptability influence retention in care among this specific population. By applying established theories, the study can offer insights into the complex interactions between individual characteristics, health system factors, and retention behaviors, contributing to the theoretical understanding of healthcare utilization in the context of HIV care among pregnant women.

### **Practice**

Develop tailored interventions targeting health system-related barriers to retention in care, such as improving access to antenatal clinics, enhancing healthcare infrastructure, reducing transportation barriers, and addressing stigma and discrimination within healthcare settings. By addressing these factors, healthcare providers can enhance the quality and continuity of care for HIV-infected pregnant women in Narok County, ultimately improving health outcomes for both mothers and infants. Additionally, implementing strategies to strengthen linkages between antenatal, delivery, and postnatal care services can promote retention throughout the perinatal period, ensuring comprehensive HIV care and support.

### **Policy**

Advocate for policy reforms aimed at addressing structural barriers to retention in care, including increased investment in healthcare infrastructure, workforce capacity building, and integration of HIV services within maternal and child health programs. By aligning policy initiatives with the unique needs of HIV-infected pregnant women, policymakers can foster an enabling environment for retention in care, ultimately contributing to the achievement of national and global HIV/AIDS targets. Furthermore, promoting community engagement and empowerment initiatives can facilitate meaningful participation of HIV-infected pregnant women in decision-making processes, ensuring that policies reflect their preferences and priorities, and fostering a supportive healthcare environment conducive to retention in care.

## REFERENCES

- Alamo, T., Wagner, J., Ouma, J., Sunday, P., Marie, L., Colebunders, R. & Wabwire- Mangen, F. (2013). Strategies for Optimizing Clinic Efficiency in a Community- Based Antiretroviral Treatment Programme in Uganda. *AIDS Behavior*. 17(1): 274 - 283.
- Ebuy H, Yebyo H, Alemayehu M. (2020). Level of adherence and predictors of adherence to the Option B+ PMTCT programme in Tigray, northern Ethiopia. *International Journal of Infectious Diseases*, 90, 135-141.
- Geng, E. H., Odeny, T. A., Lyamuya, R., Nakiwogga-muwanga, A., Diero, L., Bwana, M., ... Yiannoutsos, C. (2016). Retention in care and patient-reported reasons for undocumented transfer or stopping care among HIV infected patients on antiretroviral therapy in Eastern Africa: Application of a Sampling-Based Approach. *Clinical Infectious Diseases*, 62(7): 935–44.
- Gichane MW, Sullivan KA, Shayo AM, Mmbaga BT. (2019). The influence of healthcare infrastructure accessibility on the adequacy of antenatal care, HIV testing, and prevention of mother-to-child transmission of HIV in Tanzania. *BMC Health Services Research*, 19(1), 863.
- Gwynn, R. C., Fawzy, A., Viho, I., Wu, Y., Abrams, E. J., & Nash, D. (2015). Risk factors for loss to follow-up prior to ART initiation among patients enrolling in HIV care with CD4+ cell count  $\geq 200$  cells/ $\mu$ L in the multi-country MTCT-Plus Initiative Health systems and services in low and middle income settings. *BioMed Central Health Services Research*, 15(1), 1–10.
- Itoua, C., Nsongola, M., Koulimaya, C. G., Moutounou, G.M., & Koko, P.S. (2015). Adherence to anti-retroviral drugs in pregnant and lactating HIV positive women in Brazzaville. *East Africa medical Journal*. 92(10):495.
- Kenya AIDS response progress report (KARP) (2016). National AIDS Control Council of Kenya.
- Koto, M. V., & Maharaj, P. (2016). Difficulties facing healthcare workers in the era of AIDS treatment in Lesotho. *Sahara journal*, 13(1): 53–59.
- Layer, E. H., Kennedy, C. E., Beckham, S. W., Mbwambo, J. K., Likindikoki, S., Davis, W. W., ...Brahmbhatt, H. (2014). Multi-Level Factors Affecting Entry into and Engagement in the HIV Continuum of Care in Iringa, Tanzania. *Public Library of Science ONE* 9(8).
- Ministry of health (2016). Statistical review of progress towards the midterm targets of Kenya health sector strategic plan 2014-2018.
- Mugavero, M. J., Westfall, A. O., Zinski, A., Drainoni, M., Gardner, L. I., Keruly, J. C., ... Giordano, T. P. (2012). Measuring retention in HIV care: The elusive Gold Standard. *National Institute of Health*, 61(5), 574–580.
- Muhumuza, S., Akello, E., KyomugishaNuwagaba, C., Baryamutuma, R., Sebuliba, I., Lutalo, I. M., ... Lindan, C. (2017). Retention in care among HIV infected pregnant and breastfeeding women on lifelong antiretroviral therapy in Uganda: A retrospective cohort study. *Public Library of Science ONE* 12(12).

- Nachega JB, Uthman OA, Anderson J, Peltzer K, Wampold S, Cotton MF, Mills EJ, Ho YS, Stringer JS, McIntyre JA, Mofenson LM. (2014). Adherence to antiretroviral therapy during and after pregnancy in low-income, middle-income, and high-income countries: a systematic review and meta-analysis. *AIDS*, 28(Suppl 2), S105-18.
- Oetzel, J., Wilcox, B., Avila, M., Hill, R., Archiopoli, A., & Ginossar, T. (2015). Patient-provider interaction, patient satisfaction, and health outcomes: testing explanatory models for people living with HIV/AIDS. *Journal of AIDS care*, 27(8):972.
- Omonaiye, O., Kusljic, S., Nicholson, P., & Manias, E. (2018). Medication adherence in pregnant women with human immunodeficiency virus receiving antiretroviral therapy in sub-Saharan Africa. *Biomed central public health*, 18(1), 805.
- Rachlis, B., Bakoyannis, G., Easterbrook, P., Genberg, B., Braithwaite, R. S., Cohen, C. R., ... Geng, E. H. (2016). Facility-level factors influencing retention of patients in HIV care in East Africa. *Public Library of Science ONE*, 11(8).
- Rosenberg NE, Mtande TK, Saidi F, Stanley C, Jere E, Paile L, & Hosseinipour MC. (2017). Recruiting male partners for couple HIV testing and counselling in Malawi's option B+ programme: An unblinded randomised controlled trial. *The Lancet HIV*, 4(10), e482-e491.
- Shigdel, R., Klouman, E., Bhandari, A., & Ahmed, L. (2014). Factors associated with adherence to antiretroviral therapy in HIV-infected patients in Kathmandu District, Nepal. *HIV AIDS (Auckl)*, 6:109–116.
- Wachira, J., Naanyu, V., Genberg, B., Koech, B., Akinyi, J., Kamene, R., ... Braitstein, P. (2014). Health facility barriers to HIV linkage and retention in Western Kenya. *Biomed central health services research*, 14:646.
- World Health Organization (2011). Retention in HIV Programmes; defining the challenges and identifying solutions; Meeting Report 13 (15): 3–4.
- World Health Organization (2018). Mother to child transmission of HIV.