THE RETENTION IN ANTIRETROVIRAL THEARPY AND ITS ASSOCIATED FACTORS AMONG PREGNANT WOMEN IN GAMBORU MATERNAL AND CHILD HEALTH CLINIC (MCH), MAIDUGURI, NIGERIA.

ABSTRACT

Background: Despite several interventions and efforts to reduce the rate of transmission of HIV infection to newborns, it has been observed that there are growing cases of HIV occurrence in Nigeria especially in the northern part of the country. One of the identified causes is the failure of HIV-positive pregnant women to continue their life-long ART therapy. Therefore, this study investigates the factors responsible for pregnant women opting out of their ART procedures.

Methods: This is a quantitative study based on the analysis of secondary data from the medical records of 235 pregnant women who were enrolled in the HIV program between 2015 and 2019 in Gamboru Maternal and Child Health Clinic, Maiduguri, Nigeria. The characteristics of the patients and the prevalence of the factors and the retention rate were presented using frequencies and percentages. The predicting factors influencing ART retention were investigated using multiple logistic regression.

Results: The age of the participants ranged between 15 and 45 years. The average age of the sample was 28.9 ± 5.74. The retention rate of the patients was low (40%). In the final logistic model, the study found phone ownership (aOR, 0.075, 95% CI 0.071 – 0.336, p=0.001) as the significant factor for retention. The model explained 9.2% of the variability in retention. age at the start of ART and current ART regimen as significant predictors.

Conclusion: The study recommends that patients upon their first contact with the clinic should be provided with a means of communication to stay in touch and be easily tracked for follow-up. Therefore, communication, while they are receiving ART treatment, is vital to improving retention in care. The study recommends intensive awareness of the public and especially those who are HIV-Positive on the importance of adherence to ART regimens.

Keywords: Antiretroviral**,** Retention, Pregnant women, Maiduguri

INTRODUCTION

According to a recent report by the United Nation Children Emergency Fund (UNICEF), there has been a global increase in the rate of the number of people living with HIV in which the adolescent and young people constitute a larger share and in 2018 alone, 510,000 newly infected young people were recorded of whom adolescent between the ages of 10 – 19 years amounted to 190,000. The Eastern and Southern Africa are the regions affected most with the deadly virus with only 19 and 14 percent of adolescent girls and boys respectively have been tested and the results confirmed in the last 1 year (UNICEF, 2018). The report also revealed that by this trend, the data projected that an estimated 183,000 new HIV infections will be recorded annually among adolescents by 2030. These national and subnational programmatic data on a set of indicators to the Global AIDS

Monitoring (GAM) system are submitted by countries and are used to monitor the progress of the vast HIV/AIDS program aimed at attaining set global goals (Coffey et al., 2019; Rubin & Maki, 2019). UNAIDS set targets of 95-95-95 – 95% of PLHIV know their HIV status, 95% of people who know their status are on ART and 95% of the people on treatment have a suppressed viral load by 2030 serves as a guide in many implementing countries.

During pregnancy, delivery, and breastfeeding, HIV may be transmitted from an HIV-infected woman to the child (Boyd et al., 2019, Kumar et al., 2020). The majority of infections in children are caused by mother-to-child transmission (MTCT), which is also known as vertical transmission. Mother-Child Transmission is one of the important methods of HIV spread (Georges et al., 2024). Globally, about two million new-borns are known to be susceptible to HIV, of which about 10 percent die on an annual basis (UNAIDS, 2011). The national prevalence of HIV pathogen found in the blood of Nigerians was about 4.1% (Federal Ministry of Health Nigeria, 2011). Parent-to-Child Transmission (PTCT) of HIV/AIDS needs to be prevented and the risk of these vertical and horizontal transmissions should be decreased to below 5 percent. Globally, a significant proportion of the 180,000 child new infections occurred during the postnatal period in 2017 (UNICEF, 2019). The postnatal phase is considered as a stage with a high potential for vertical transmission. The identification and engagement of tolerable ART seem to be an important strategy that may positively influence medication adherence.

According to the recommendations of the WHO on the lifelong benefits of antiretroviral therapy (ART) for all expectant and nurturing women infected with HIV, an effective transition from maternal and new-born care to the Option B+ services, followed by a lifelong commitment to ART is critical (Sangwan et al., 2022, Uloeme et al., 2022). Option B+ is an HIV/AIDS intervention approach that aims at the prevention of vertical transmission of HIV from an infected pregnant woman to her baby with immediate commencement of lifelong antiretroviral medications regardless of the CD4 level. The commitment to treatment is essential in achieving an optimal health outcome and plays a critical role in reducing HIV-related opportunistic infections, comorbidities, and mortalities. In a study by Olakunde et al. (2019) published in the International Health article, Nigeria has contributed the highest number of HIV-infected infants globally, despite remarkable health system-related achievements in the Prevention of mother-to-child transmission of HIV (PMTCT) over the last decade. The outcome also suggests that reducing vertical transmission in Nigeria requires the implementation of viable, culturally relevant, and effective approaches and measures that address a range of issues related to the health system. (Olakunde et al., 2019).

Existing studies have investigated intensively the factors related to retention and default of pregnant women in the Lifelong ART program. Researchers have examined both social and demographic factors as they relate to retention in care. However, the correlation is not equal to causation, i.e. the association or correlation of these factors with the retention or discontinuation of the ART program is not necessarily an indication that they are accountable for the retention outcome (retained or not retained). This study fills the gap by investigating the association between social-demographic factors and the retention or discontinuation of ART among pregnant women.

This study explored some factors linked to the poor efficacy of the HIV programs and predictors of low retention. The findings from the study will provide insights on the factors that are likely to be responsible for the low retention in the care of pregnant women in the Gamboru MCH clinic. The identification of such factor(s) will inform decision-makers and important stakeholders on the

next step of action or policy to be embarked on to ensure retention rate increases going forward in the region.

METHODOLOGY

Study Approach and Design

The present study aims to investigate retention in care and associated factors among pregnant women on antiretroviral therapy (ART) in Nigeria. The research adopts a positivist paradigm and a quantitative survey that includes the use of secondary data. The justification for the choice of this positivist paradigm is because it believes in the acquisition of knowledge and the understanding of natural phenomena through observation and without ready-made interference. The quantitative study design offers a structure for this study, it also provides opportunities such as the ability to obtain, reuse, and interpret data within a short period, the data is extracted, analyzed, polished, and is unique to the study's purpose.

The quantitative study design helps in identifying threats, causation, exposure, and relationship from historical data of patients in the present study. The study also helps to identify if there is an association between several potential factors and retention rate. The design is appropriate due to the method of generating data which is existing reports of morbidities in hospitals across the area of interest.

Other limitations of the study design include confounding bias (absence of randomization to show that risks tied to chance factor might explain an outcome of interest), information bias (when historical secondary data is used, the risk of incomplete or excess capture of the outcome or exposure measures) and selection bias (because this study design makes use of only the medical records of the clients that showed up at the hospital, we might be committing a selection bias by not capturing the data from those who refuse to show up at the hospital) and are positive of the desired outcomes. To achieve the objective of this study, important details (e.g. date of ART initiation, gestation, contact address, educational background, and distance to the health facility) were collected to analyze the relationships among the variables.

Study Setting

The study was conducted in Gamboru MCH which is one of the high capacity health facilities located in Maiduguri, the capital city of Borno State. It provides antenatal care services to over 2000 pregnant women within the community and offers integrated HIV testing, counseling, and treatment services. The health facility is situated centrally in the capital city which makes it accessible by the residents in accessing health services. The 2019 projected estimated population of Maiduguri was 779,909. Nigeria practices the ward health system which requires the recognition of 3 categories of health facilities (health posts, health clinics, and Primary health care centers). Gamboru MCH serves as a PHC center, receives referrals from the health posts and clinics, and provides health services to at least 20,000 people.

The Gamboru MCH has met the minimum service package criteria in terms of human resources for health, infrastructure, drugs, and availability of medical consumables which is a requirement for a standard PHC to provide at least the basic and essential health package including maternal and child survival programs for the clients. The Ministry of Health (MoH) provides general oversight to the health facility categories and is supported by other humanitarian agencies. The

health facility has one of the highest numbers of enrolled pregnant women in the HIV program and offers free testing, counseling, and treatment services to people living with HIV (PLHIV). To improve demand for service, the health facility also adopted some quick-win strategies such as organizing monthly medical outreaches and intensive defaulter tracking within the community.

Study population

In the Maternal and Child Health Clinic (MCH), Gamboru, Maiduguri, Nigeria, the study population consisted of pregnant women who are HIV positive and are receiving antiretroviral therapy (ART) in the maternal and child health Gamboru during 2015-2019. They were mostly indigenous women and lived within 2 kilometers of the MCH clinic. Accessibility to the clinic in terms of distance and mobility were not potential factors that will affect the retention outcome considering the strategic siting of the clinic.

Eligibility Criteria

To be eligible for this study, only the records of all the clients who were pregnant, tested positive for HIV, and were on ART from January 2015 to December 2019 (5 years) were considered. From the available secondary data, the minimum age of the clients was 15 years, while the maximum age was 43 years old. This falls within the reproductive age of women which is 15 – 49 years All clients who were not pregnant were excluded from the study regardless of the HIV status, the initiation, and continuum of care in ART. The focus was the pregnant women.

Sampling Procedure

The sampling procedure consists of all eligible and complete records carefully filtered from the electronic database. A complete census was conducted, including all eligible women in the study database. For this study, the detail medical information of all HIV-confirmed positive pregnant women who initiated ART in the facility for up to six months between January 2015 and December 2019, were reviewed and used. Pregnant mothers who do not return to the clinic within 6 months of the scheduled hospital visit and do not have a death certificate nor information regarding the transfer to other HIV management centres may be tracked during the intensive defaulter tracking. If the tracking fails, such client may be termed as a loss to follow-up (LTFU).

Data Source

Traditionally, during the daily clinical activities, medical cards, Antinatal care (ANC), and HIV registers (referred to as data collection tools) were used to collect information regarding the clients' health status and then further entered electronically into the information database. The 2 main data sources for this study were the inputs from these data tools and the electronic database of the health facility. Routinely, the medical history of the clients is usually collected by the matron (ANC provider) and the HIV specialist, and the after results are compiled into the registers by the health facility medical recorders.

Since the data collection was for clinic purposes and not initially intended for this study, some challenges at this data collection point were incomplete collection or error in collecting some client's vital medical information that may be useful for this study (e.g. education background, the actual address of clients, and employment status, etc.)

The data extraction was done from the health facility database. All medical records, registries of diseases, data on campaigns and surveillance, and other vital records are stored here. Very few

employees have access to the data control room and the access code for data entry into the electronic database is only available to State and LGHA M&E officers.

Only the health facilities pre-existing data were used for this study. They were obtained from the hand cards, registers, DHIS system. These data were originally collected based on the daily visits of a client to the health facility. They were not intended to be used for the purpose of this study.

Statistical Analysis of Data

The data were finally captured electronically and analyzed using SPSS V.25. The variables in this study are further prepared for analysis. The Age variable has been transformed into an ordinal variable with three levels: 15-25yrs, 26-35yrs, and 36-45yrs. Age measurement is numeric data that describes the age of the client at the beginning of ART treatments. Descriptive statistics (mean and the standard deviations), were used to describe the proportion of categorical and continuous data. The chi-square correlation statistical test was used to evaluate the degree of a significant relationship between the dependent (retention rate) and independent variables in the investigation of the study objectives. As retention was a binary variable. Binomial logistic regression statistical tests are performed at a 95 percent confidence level, which suggests a 5 percent risk of error. A strong relationship is inferred between variables whenever the p-value is less than and equal to 0.05, otherwise an assumption may be made that there is no strong correlation between variables. The justification for Chi-Square statistical test is due to the categorical or nominal nature of variables. Also, it computes a contingency table showing the distribution of the factors between variables in frequencies and percentages. The test is carried out at a 95% confidence interval.

Employment measurements reflect if the client is employed or unemployed. The Access-to-Service Measure indicates which services are used by the client either at home or at a health facility. The year variable is a categorical measure covering a period of 5 years from 2015 to 2019. These indicate the year the client begins treatment. Other social-economic status includes telephone; assessing whether or not the client has a mobile phone. The educational variable has four levels; none at primary secondary, secondary, and post-secondary levels.

Ethical issues

Permission for the conduct of this study was granted by the Borno State Primary Health Care Development Agency (BSPHCDA) and the health facility coordinator for Gamboru Maternal and Child Health Clinic (MCH). The study was also approved by the University of Roehampton. The data collection focused on the client's case file numbers, no name was line-listed thus maintaining total patient privacy and confidentiality at all times.

RESULTS

Social Demographic Characteristics of the Sample

The data collected consists of a total of 235 medical records of pregnant women from age 15 to 43years old. The ART clients in this study comprised mainly of mid-aged women between 26 and 35years old (61.7%) followed by clients aged between 15 to 25years old (27.7%) and those aged 35 years and older, which constitute about a tenth of the total sample (10.6%). The average age of the sample is 28.9 ± 5.74. Almost all of the women were adults 1st. Line are LTFU (Loss to follow up) while 31.8% and 8.9% stopped and were transferred out respectively. Over a third, 36.6%, of

the women, have no education, over half of them, 58.7% have primary education, only 3.4% have a secondary education while 1.3% have post-secondary education. Most of the respondents are married, 84.1%, about 2.8% are divorced and only 13.1% are single women. The proportion of employed women is 36.6% while the remaining 65.1% were unemployed. The employment characteristics are used as a proxy to the poverty index in this study. Some of the women had no mobile phones, 11.5%, while most of them own phones, 88.5%. Over half of the women delivered their babies at home, 67.2%, while 32.8% of others delivered at a health facility.

Table 1 shows the social and demographic characteristics of the women enrolled in the ART program. The average month from the start of ART to the last pick-up date was 6.2 ± 10.18 with a minimum of 0 and a maximum of 52 months. The current viral load of the pregnant women including the ones with 0 has an average of $389.3.2 \pm 1237.7$, without the 0 current viral loads, the average is 650.88 ± 1538.46. The average age of the women enrolled within the timeframe was 29.8 ± 5.6 years.

Table 1 Social and Demographic Characteristics of women

	Frequency	Percent
All	**235**	100
Age group,		
15-25	65	27.7
26-35	145	61.7
36 and over	25	10.6
2015 Age at ART Start		
15-25	1	33%
26-35	2	67%
36+	-	-
2016 Age at ART Start		
15-25	-	-
26-35	6	100%
36+	-	-
2017		
15-25	10	40%
26-35	15	60%
36+	-	-
2018 Age at ART Start		
15-25	21	28%
26-35	45	61%
36+	8	11%
2019 Age at ART Start		
15-25	33	26%
26-35	77	61%
36+	17	13%
Education Status		
None	86	36.6
Primary	138	58.7

Secondary	8	3.4
Post-Secondary	3	1.3
Marital Status		
Married	180	84.1
Divorced	6	2.8
Single	28	13.1
Job Status/ Employment		
Employed	86	36.6
Unemployed	153	65.1
Owns Phone		
Yes	208	88.5
No	27	11.5

The women within the age grade of 26 – 35 years indicate the highest retention rates so as the women with the marital status of "Married". Also, unemployed clients and women who own phones constitute a significant portion of the retention rates above average.

Retention in care implies the initiation, adherence, and continuum of care till the discharge or death of the client. Table 2 indicates the clinical characteristics and outcome of the clients enrolled in the ART program. The clinical outcome may be Active, Dead, LTFU, Stopped, or Transferred out.

Table 2 Clinical Characteristics related to the clients

Clinical Characteristics	Frequency	Percentage
Regimen Line at ART		
Adult. 1st.Line	**234**	99.6
Peds. 1st.Line	**1**	4
Current ART Status		
Active	95	40.4
Dead	4	1.7
LTFU	47	20

Stopped	68	28.9
Transferred Out	21	8.9

1st.Line (99.6%) while a minute (0.4%) were Peds.1stLine. The current ART status of the women included 40.4% that are active in therapy (i.e. retention rate), 1.7% are dead, 20.0% are LTFU (Loss to follow up) while 31.8% and 8.9% stopped were transferred out respectively. The average month from the start of ART to the last pick-up date was 6.2 ± 10.18 with a minimum of 6 and a maximum of 53 months. The current viral load of the pregnant women including the ones with 0 has an average of $389.3.2 \pm 1237.7$, without the 0 current viral loads, the average is 650.88 ± 1538.46. The current age of the women is average 29.8 ± 5.6 years.

Retention rate

The study defines retention as the number of pregnant women who continue to receive treatment after 6 months. The retention rate is the number of women who are still active in treatment divided by total women. Per this study, the minimum duration for women in care is from 6 months while the maximum for any client who has stayed in 53 months. The mean duration of clients is about 6.23 ± 10.33.
The general retention rate across the years was 40.43%, that is, for every10 pregnant women attending the ART treatment, less than half of them (4) would remain active while the others would be either dead, stopped the treatment, lost to follow up or transferred.

As shown in Table 3, The year 2019 shows the highest number of total enrolled and also the highest retention rate between 2015 – 2019. It constituted 56.7% of the total number of clients

retained in care.

Table 3 Retention rates of pregnant women

YEAR	Total Enrolled	LTFU	Died	Stopped	Transferred	Remained
2015	3 (100%)	-	-	1 (33.33%)	1 (33.33%)	1 (33.33%)
2016	6 (100%)	2 (33.33%)	-	2 (33.33%)		2 (33.33%)
2017	25 (100%)	3 (12%)	-	10 (40%)	2 (8%)	10 (40%)
2018	74 (100%)	19 (25.68)	2 (3%)	34 (40%)	9 (12.16%)	10 (15.51%)
2019	127 (100%)	23 (18.11%)	2 (1.57%)	21 (40%)	9 (7.09%)	72 (56.69%)
All	**235**	**47**	**4**	**68**	**21**	**95**

Comparatively, regarding the total enrolled, the year 2018 indicates the highest number of LTFU, Stopped and transferred out compared to the number of women enrolled in the other years into the ART program.

Table 4 Retention rates by 6 months and 1 year

	According to Data	**6Months Definition**	**12Months Definition**

YEAR	Total Enrolled	Not Active	Active	% Active	Not Retained	Retained	% Retained at 6months	Not Retained	Retained	% Retained at 12months
2015	3	2	1	33%	-	3	100%		3	100%
2016	6	4	2	33%	-	6	100%		6	100%
2017	25	15	10	40%	8	17	68%	11	14	56%
2018	74	64	10	14%	51	23	31%	64	10	14%
2019	127	55	72	57%	120	7	6%	127		0%
All	**235**	**140**	**95**	**40%**	**179**	**56**	**24%**	**202**	**33**	**14%**

Although no specific factors were identified to have influence retention rates across the years, Table 5 indicates that a significant decline in a seemingly stable retention rate was observed in 2018 and a sharp increase in 2019 with pregnant women between the age group of 15 -25 years constituting the highest proportion.

Table 5 Retention rate of pregnant women

Retention Rate by Age and Year			YEAR			
Age Group	2015	2016	2017	2018	2019	Retention by Age
15-25	0.00%	-	20.00%	19.05%	66.67%	43.08%
26-35	50.00%	33.33%	53.33%	8.89%	57.14%	40.69%
36-45	-	-	-	25.00%	35.29%	32.00%
Retention by Year	**33.33%**	**33.33%**	**40.00%**	**13.51%**	**56.69%**	**40.43%**

The table revealed that the overall retention rate for pregnant women enrolled in the ART program was highest in 2019 (56.7%) and lowest in 2018 (13.5%) while a stable result was observed between 2015 and 2016. However, the overall retention rate across the study period was 40.43%. In summary, Table 6 revealed that the proportion of clients not retained in care across all age group were higher than those retained. The relationship between the sociodemographic characteristics was reviewed.

Table 6 Association between retention rate and various patient characteristics

		Not Retained	Retained	Total	Pearson Chi-Square	2-Sided P
Age	15-25	37 (56.9%)	28 (43.1%)	65		
	26-35	86 (59.3%)	59 (40.7%)	145	0.931	0.628
	36 and above	17 (68.0%)	8 (32.0%)	25		
Employment	Employed	49 (59.8%)	33 (40.2%)	82		
	Unemployed	91 (59.5%)	62 (40.5%)	153	0.02	0.967
Marital Status	Married	117 (59.4%)	80 (40.6%)	197		
	Not Married	23 (60.5%)	15 (39.5%)	38	0.017	0.896
Level of Education	Non-Educated	46 (53.5%)	40 (46.5%)	86		
	Educated	94 (63.1%)	55 (36.9%)	149	2.086	0.149

The relationship between the outcome variable (retention) has no significant association with exposure variables of age, employment, marital status, and access to the facility, the asymptotic significant values were more than ($p>0.05$). From table 7, it can be concluded that there exists a significant association between retention and year of ART start also with the ownership of mobile phones by clients ($p<0.05$). However, education has no significant relationship with retention.

Table 7 Comparison by year and ART regimen

		Not Retained	Retained	Total	Pearson Chi-Square	2-Sided P
Year	2015	2 (66.7%)	1 (33.3%)	3		
	2016	4 (66.7%)	2 (33.3%)	6		
	2017	15 (60.0%)	10 (40.0%)	25	36.3999	0.000
	2018	64 (86.5%)	10 (13.5%)	74		
	2019	55 (43.3%)	72 (56.7%)	127		
Regimen Line at ART Start	Adult. 1st.Line	139 (59.4%)	95 (40.6%)	234	0.681	0.409
	Peds. 1st.Line	1 (100%)	0	1		

To access the factors predicting the retention in the care of clients during the lifelong ART treatment, the binary multiple logistic regression analysis was carried out. From the model summary, the exposure variables are responsible for between 23.7% (Cox and Snell R^2) and 31.9% (Nagelkerke R^2) variableness in the retention rate of the clients on the ART program.
Table 8 reveals the variable(s) which significantly influence retention rate using a multiple logistic regression. MLS exposes the highest predictor for low retention in this analysis.

Table 8 Coefficient of logistic regression with an odds ratio

	B	Sig.	Adjusted Odds Ratio	95% C.I. Lower	Upper
15-25	**Reference**				
26-35	0.568	0.259	1.765	0.658	4.737
36 and above	0.652	0.166	1.919	0.763	4.825
Employed	**Reference**				
Unemployed	-0.386	0.193	0.680	0.380	1.215
Married	**Reference**				
Not Married	0.436	0.250	1.546	0.736	3.246
Education	**Reference**				
Non-Educated	0.408	0.160	1.504	0.851	2.657
Owns Phone	**Reference**				
Do not Own Phone	-2.594	0.001	0.075	0.017	0.336
Constant	-1.127	0.075	0.368		

a. Variable(s) entered on step 1: Age, Employment, Marital Status, Level of Education.

The outcome of the multiple logistic regression indicated phone ownership (B=-2.461, $p<0.05$) as a significant predictor of retention of clients. For age groups, compared to women age 15-25, the odds ratio was (0.658-4.737, p= 0.9), for women aged 26-35 and (0.763-4.825, p= 0.259) for women aged 36 and above. This shows that the age 26-35yrs and those that are 36yrs and above

are almost twice as likely to be retained than those who are between the ages of 15-25yrs. For the employment characteristics, compared to the employed, the odds ratio was (0.380 – 1.215, p= 0.193) compared to the unemployed. The retention by marriage showed that compared to the married, the odds ratio was (0.736 – 3.246, p= 0.250), with the unmarried. The education characteristic, compared to the educated, odds ratio was (0.851 – 2.657, p= 0.160), to the non-educated. Ownership of phones showed that compared with those who owned the phone, the odds ratio was (0.658-4.737, p= 0.259), to those who do not own a phone.

Table 9 Model accuracy and specification

	Model Summary			
N	-2 Log Likelihood	Cox & Snell R2	Nagelkerke R Square	Hosmer-Lemeshow test -chi(sig)
235	294.36	0.092	0.125	3.332(0.912)

The above table includes the pseudo-R-squared values. Nagelkerke R-square (0.125) indicates that the model is not suitable. The Cox & Snell R-squared also indicates that only 9.2 percent of the retention in care is explained by the logistic regression. The Hosmer-Lemeshow test indicating how adequately the model describes the data showed a good fit, that is, sig>0.05. The model adequately fits the data.

DISCUSSION

It has certainly been recognized that commitment to and retention in ART treatment is intrinsically related to the clinical outcomes. Nonetheless, the uncertainties linked to the variables related to the retention in ART has made it more complex to ascertain which particular factor has the most impact on retention. Other studies have also indicated that the educational background or the knowledge of antiretroviral therapy, socio-economic status, awareness of HIV status and acceptance, as well as the implications of inequality, all have majorly impacted on the adherence and retention in care of ART. The majority of the clients who were started on the Option B+ program have the basic knowledge of antiretroviral therapy and its importance. However, the data indicated that the women preferred to deliver their babies at home rather than at the health facilities. In this scenario, other than stigmatization which may be perceived to be a significant factor associated with this practice, there is a need to conduct further (qualitative) studies to understand the choice for the place of delivery for other pregnant women and women of childbearing age infected with HIV in the area. One of the possible ways to contract infections, especially during labour and childbirth, has also been recognized to be by the poor health practices of traditional birth attendants (TBAs). It may therefore be of vital importance to recognize the motivators that often promote non-institutionalized delivery and the conduct of unskilled workers' delivery.

Contrary to other articles, the present study did not find age to be significantly associated with retention nor as a significant predictor of retention in the ART program. The finding from the study by Muhumuza et al. (2017) and another study by Dzangare et al. (2015) all found age to be significantly connected with retention. Another study by Kiwanuka et al. (2018) on pregnant women in the ART program in Uganda found education to be a significant factor promoting the

retention in care, however, the present study does not support this as the data showed education not to be a significant contribution to retention of the women on the program.

Poor adherence and care retention have many implications for public health which are detrimental to the health of the global community as a whole. Such public health implications may include increased rates of morbidity and mortality among the infected population, undesirable ART program outcome, Poor HIV program impact with increased incidence of vertical transmission. The emergence of HIV antiretroviral drug resistance strains and a poor response to therapy could be other therapeutic issues.

In addition, even with the technical support and availability of funding for the HIV program, increasing HIV-related morbidity and mortality will impact negatively on the reputation of the health industry, thus, leading to undesired outcome indicators.

The antiretroviral program is now a life-saving program as, regardless of the patient's CD4 cell count, it offers unconditional eligibility for lifetime ART initiation. As evidenced in some studies, vertical transmission has declined significantly with the scaling up of HIV programs and other related interventions in sub-Saharan Africa. However, there is uttermost need to improve and adopt comprehensive HIV interventions in countries such as Nigeria with only a 21% reduction in the rate of a new infection.

The complexities associated with the adherence and retention of pregnant women in ART tend to be complicated. That being said, since these factors vary from individual to individual as well as context to context, a lot of creative interventions, HIV program re-evaluation, and comprehensive HIV management framework will be important to improve demand creation and service uptake. The primary goal of integrated health systems is to offer comprehensive treatment or standardized care to the clients. The concept is to improve quality of care and favourable health outcomes. In addition, there is a likelihood of improved and the creation of a community free of children infected with HIV. Through the adoption of different research strategies, identifying and understanding these complexities is critical in addressing the associated factors on retention in real-life conditions.

CONCLUSION

This study has evaluated several factors to determine the ART retention rate among pregnant women as well as to investigate the associated factors. It has highlighted some important insight to the relevance and implications to public health.

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