Original Research Article

Factors Associated with Early and Late Initiation of ART in HIV Infected Pregnant Women in the South West Region, Cameroon.

ABSTRACT

Background: The prevention of mother to child transmission of HIV regimen called Option B+ requires that all HIV positive pregnant women (PW) begin Antiretroviral Therapy (ART) as soon as they are tested. Efforts geared towards achieving increase in ART uptake among HIV+ PW still have not achieved expected results given that some of these women are reluctant to start treatment following diagnosis. It was then imperative to examine the factors that influence the choice of when these women accept to begin ART, be it early or late.

Methods: We conducted a cross sectional analytic study in six health facilities in the South West region of Cameroon. Two groups of HIV + PW were recruited in these facilities; those who accepted early ART initiation within a week of diagnosis and those who accepted ART initiation later than one week from diagnosis. Data was entered into and analyzed by Epi info version 7.2.2.6. The Chi square test was used to test for statistical significance with Alpha set at 0.05. Multivariate analysis was performed to eliminate confounders.

Results: One hundred and eighty HIV + PW were recruited with a mean age of 28.9years (SD=2.4years). HIV+ PW diagnosed during an antenatal care (ANC) visit were more likely be initiated ART early ((OR)=21.7, 95%CI 3.2-143.7, *p*=0.00067). State-run facilities were less

likely to initiate clients early (AOR=0.2, 95% 0.05-0.6, *p*=0.00018). ANC visit and facility type were significantly associated with early initiation of ART.

Conclusion: Additional efforts are required to course PW to go for early ANC while state-run health facilities need assistance to improve on early ART initiation for clients in need. These efforts could contribute to reducing paediatric HIV in the Cameroonian population.

Key words: HIV, Initiation, Early, Anti Retro viral, Therapy, Cameroon.

1. INTRODUCTION

With the escalating prevalence of Acquired Immunodeficiency Syndrome (AIDS), there have been Global and local initiatives to combat the AIDS pandemic with enormous resources invested. After many years of research, there is still no hope for a cure in the near future. As such, Anti-Retroviral Therapy (ART) remains the major treatment option with significant progress made since its approval for use in 1987.[1, 2]. The potential of ART to eliminate the major route of paediatric HIV has been seen in Global initiatives such as The Global Plan towards the Elimination of New HIV Infections among Children by 2015 and Keeping Their Mothers Alive, lunched by Joint United Nations Program on HIV/AIDS (UNAIDS) in 2011. It had as objectives to reduce new paediatric infections by 90%, reduce HIV associated deaths in women during pregnancy, childbirth and puerperium by 50% and reduce mother to child transmission of HIV to less than 5% by 2015 with baseline values as of 2009. [3]. By the end of 2014, the countries in Eastern and Southern Africa had made significant progress while others especially those in Central and West Africa didn't do well. For example, Cameroon had only succeeded in reducing new infections by less than 30%. ART coverage had increased from 37% in 2009 to 77% in 2014 cutting maternal to child transmission (MTCT) from 28% to 14% but this was still far from the desired MTCT rates of <5%

Despite its potential benefits, the uptake and use of prevention of MTCT services especially ART still remains low, resulting in the persistence of paediatric HIV infection [4, 5]. The World Health Organization (WHO) recommends that efforts be made to reduce the time between diagnosis and initiation based on assessment of patient's readiness to start ART. Even though this did not imply same day initiation, a study in Malawi found that majority of the women who were loss-to-follow-up (LTFU) were those who started ART on the same day. [6].This means that the time to initiation remains an important factor in the patients' retention in care and treatment outcomes. There have however been few studies so far that have assessed the factors associated with the time to ART initiation in patients in our setting. [6, 7].

This study aimed at determining the factors that are associated with the decision of newly diagnosed HIV+ PW on when to start ART with the view of improving the ART coverage of pregnant women [8].

2. MATERIALS AND METHODS

2.1 Study Design, Population and Setting

This was a cross-sectional analytic study of newly diagnosed HIV + PW who initiated treatment (ART) in the Option B+ units of six health care facilities in the Southwest Region of Cameroon, West Africa, from November 2017 to April 2018. Purposive sampling of three private and three state owned facilities Limbe, Buea and Kumba health districts was done based on their relatively higher average number of PW tested for HIV monthly and which were actively implementing Option B+. Included in the study were all PW newly diagnosed HIV positive, naïve to ART who consented to participate in the study. Pregnant women previously initiated on ART before onset of pregnancy were not included. Early initiation was define as accepting ART initiation within a week of diagnosis while late initiation was defined as accepting initiation one week and above from the date of HIV diagnosis.

2.2 Sample Size Calculation

Sample size was calculated using the formula for comparing proportions [9]

$$\mathbf{n = [(Z_\alpha + Z_\beta)^2 x\ p\ x\ (1-p)] / [(p_1-p_0)^2]} \quad \mathbf{(1)}$$

With the following assumptions; Prevalence of early initiation, $\mathbf{p_1 = 50\%}$, prevalence of late initiation, $\mathbf{p_0 = 25\%}$ with **Statistical significance of α=5%,** and 95% confidence Interval $\mathbf{Z_\alpha = 1.96.}$ Probability of type II error**,** $\mathbf{\beta = 10\%}$ and a

Power of 90%, $\mathbf{Z_\beta = 1.28.\ p = 1/2(p_0+p_1)}$. (2).

A minimum sample size of 156 participants was gotten. With a ratio of 3:1 for Early Initiation: Late initiation, we had a minimum sample size of 39 participants for late Initiation and 117 participants for early Initiation. Sampling was done by convenience. Research assistance approached and proposed the study to all pregnant women newly diagnosed HIV positive and initiated on ART in the selected health facilities during the period of the study.

2.3 Data Collection

Data collection was carried out during the period November 2017 to March 2018 using pretested interviewer administered questionnaires adapted from a previous study [10]. . Pregnant women who gave their consent were interviewed daily during their Antenatal clinics in the catchment health facilities by trained psychosocial workers. Information on socio-demographic variables included: (age, marital status, occupation, level of education, and address); current pregnancy and information on HIV diagnosis (date, place and circumstances of diagnosis, partner disclosure, pregnant woman's motivation for initiation to ART) were collected. To avoid recall bias, date of diagnosis, date of initiation and gestational age at diagnosis were gotten from ART and ANC registers.

2.4 Data Management and Analysis

Data was coded and entered into Epi info version 7.2.2.6 with frequencies generated for gravidity, parity, and gestational age. The Chi square test was used to test for statistical significance with the p-value set at 0.05. Univariate analysis was used to obtain the Odds ratios, Confidence intervals and P-values were gotten using the Chi square test. Statistically significant factors (*P*-value less than 0.05) were selected and included in the model for multivariate logistic regression to determine factors associated with early or late initiation of ART.

2.5 Ethical Considerations

Ethical clearance to carry out the study was obtained from the University of Buea, Faculty of Health Sciences Institutional Review Board ($N^0$2018/136/UB/SG/IRB/FHS) and the Cameroon Baptist Convention Health Services Institutional Review Board (IRB 2018-01). Administrative Clearance was obtained from the Regional Delegate of Public Health and the District Medical Officer of the Kumba health District. Authorization to carry out the study was also gotten from the Administration of the institutions concerned. Before taking part in the study, Research Assistants ensured that the women understood the purpose, procedure, risk and benefits of the study. Data was collected using a pre-tested questionnaire and interviewers administered the questionnaire in the language best understood by the participant (English, French or Pidgin). The women were also given the option to withdraw from the study at any point during the interview if they didn't feel comfortable to proceed. Those who accepted to take part in the study signed a consent form after having understood the procedures. Women younger than 18 years were considered emancipated given that they were pregnant and had consented to ART. Confidentiality was also guaranteed by ensuring anonymity of study participants. Codes were used in the place of names and other revealing information was concealed.

3. RESULTS

3.1 Study Population

Of the 180 HIV infected pregnant women who took part in the study, 61 (34%) were between 25-29 years and 65 (36%) were between 30-34years. The age group least represented in our study were those below 18 years and those who were 40 years and above with four participants (2%) and two participants (1%) respectively. Majority of all the study participants 68% (n=124) were married while just 1% (n=2) of them were divorced. 18% (n=32) were single while 13% (n=24) were cohabiting.

Thirty per cent (n=54) of the respondents had completed at least primary education, 62% (n=102) of them having completed secondary education and just 6.7% (n=12) had been to the University. Most of the study participants 67% (n=120) were diagnosed during the second trimester of pregnancy, 24% (n=43) diagnosed in the third trimester while 9% (n=16) of them were diagnosed during the first trimester of pregnancy.

A total of 180 HIV positive pregnant women from 6 health facilities were enrolled in the study from January 2018 to April 2018. One hundred and thirty-eight of these women (77%) initiated ART early as defined by the study, that is either on the same day or within a week of diagnosis. A total of forty two of the women (23%) initiated ART after one week of diagnosis (late initiation).

3.2 Proportion of Early and late initiation

Two groups of respondents were involved in this study, those who accepted to be initiated on the same day or within one week of diagnosis and those who were initiated one week and above following diagnosis with HIV.

One hundred and thirty eight (77%) of all the study participants were initiated to ART with a week of being diagnosed with HIV while 23% (n=42) of them only accepted to be initiated one week after diagnosis. Of the HIV positive pregnant women who were initiated within a week, 97% (n=114) were initiated on the same day of diagnosis while 3% (n=4) were initiated were initiated after a day but within the same week of diagnosis.

3.3 Factors associated with early and late initiation

Table 1. Sociodemographic factors associated with Early and late initiation

Characteristics	Late Initiation n=42(%)	Early Initiation n=138(%)	OR	95%CI	*P*-value
Age(years)					
<25years	6(15.8)	32(23.2)	0.6	0.1-2.1	0.216
25years and above	36(85.7)	106(76.8)	1		
Marital status					
Single/Widow	8(19.0)	26(18.8)	1.0	0.4-2.4	0.980
Married/Cohabiting	34(81.0)	112(81.2)	1		
Level of Education					
Primary and less	16(38.1)	40(29.0)	1.5	0.7-3.1	0.264
Secondary and above	26(61.9)	98(71.0)	1		
Occupation					
No formal employment	36(85.7)	124(89.9)	0.7	0.2-1.9	0.454
Formal employment	6(14.3)	14(10.14)	1		
Religious Affiliations					
Pentecostal	20(47.6)	36(26.1)	2.6	1.2-5.2	0.082
Catholics/Protestants	22(52.4)	102(73.9)	1		
Region of Origin					
South West Region	22(52.4)	72(52.2)	1.0	0.5-2.0	0.987
Other Regions	20(47.6)	66(47.8)	1		

OR= Unadjusted odds ratio, %=percentages, CI = Confidence interval

The Chi square test was used to test for statistical significance of socio-demographic factors.

As shown in Table 1 above, none of the sociodemographic factors had a statistically significant relationship with either early or late initiation. Pentecostal Christians were two times more likely to start ART late while those with primary education or less were 1.5 times also likely to initiate ART late.

3.4 Obstetrical factors associated with late initiation

Of the three obstetrical factors, Parity was associated with initiation (***P***-values <0.05). Multiparous women were more likely to initiated ART late than Nulliparous and Primiparous women.

Table 2. Univariate analysis of Obstetrical factors associated with late initiation

Characteristics	**Late Initiation (n=42)**	**Early Initiation (n=138)**	**OR**	**95%CI**	**P-value**
Gestational Age					
<20weeks of gestation	18(42.9)	48(34.8)	1.4	0.7-2.8	0.34
>20weeks of gestation	24(57.1)	90(65.2)	1		
Gravidity					
Primigravida	8(23.5)	36(28.6)	0.8	0.3-1.6	0.6794
Multigravida	34(76.5)	102(71.4)	1		

Parity					
Multiparous	24(57.1)	46(33.3)	2.7	1.3-5.4	*0.005*
Nulliparity/ Primiparity	18(42.9)	92(66.7)	1		

The study found that women who had at least two children were 2.7 times more likely to be initiate ART late compared to women who had one or no child. The number of pregnancies and the gestational age were not associated with late initiation.

3.4 HIV Stigma and disease related factors

Table 3. Univariate analysis for disease related factors associated with late initiation

Characteristics	**Late Initiation**	**Early Initiation**	**OR**	**95%CI**	***P*-value**
Disclosure to partner					
No	26(61.9)	66(47.8)	1.8	0.9-3.6	0.11
Yes	16(38.1)	72(52.2)	1		
Disclosure to family					
No	31(76.2)	93(66.7)	1.4	0.6-3.0	0.43
Yes	11(23.8)	45(33.3)	1		
Partner tested for HIV					
No	28(66.7)	92(66.7)	1.0	0.5-2.08	1.00
Yes	14(33.3)	46(33.3)	1		
Events of client diagnosis					
VCT/ Referred	14(33.3)	4(2.9)	16.8	5.1-54.7	**0.00005**
Came for ANC	28(66.7)	134(97.1)	1		

The event of diagnosis (or reason for which the pregnant woman sought consultation) was the only HIV stigma and disease related factor that showed an association (*p*-value<0.05) with late initiation to ART. Women who had not disclosed their status were almost twice more likely to initiated ART late than women who had disclosed their status to their partners (Table 3).

3.5 Health facility related factors for late initiation to ART

Table 4. Health facility related factors associated with late initiation to ART.

Characteristics	Late Initiation (n=42) (%)	Early Initiation (n=138) (%)	OR	95% CI	*P*-value
Facility Type					
Public	20(47.6)	24(17.4)	4.3	2.04-9.12	**0.0004**
Private	22(52.4)	114(82.6)	1		
Distance from health facility					
>20km	8(19.1)	23(17.4)	1.2	0.5-2.8	0.7204
20km and below	34(80.9)	115(82.6)	1		

As for health facility-related factors, facility type showed a statistically significant (P-value=0.00047) association with initiation to ART (table 4). Women diagnosed in State-owned facilities were about four times more likely to initiate ART late compared to women diagnosed in private health facilities. The distance from the health facility did not have any association to late initiation to ART.

Multivariate analysis of factors Associated with early initiation

Table 5; Multivariate analysis of factors associated with early initiation

Factor	Adjusted OR	95% CI	*P*-value
Events of diagnosis	21.7	3.2-143.7	**0.00067**
Facility type	0.2	0.05-0.6	**0.00018**
Parity	1.4	0.4-4.6	0.500
Occupation	0.3	0.05-1.4	0.295

Following the Multivariate logistic regression, two factors were found to be related both with early and late initiation of ART in the health facilities in the South West Region (Table 5). These were; type of facility (Public or Private) with a *p*-value of 0.00067 and event or circumstances of diagnosis (ANC/ others) with a *p*-value of 0.00018.

3.6 Reasons for starting ART

Table 6. Reasons why respondents accepted early or Late initiation to ART

Reason for early Initiation	Number Responded	Percentage
PMTCT only	108	81%
PMTCT and the desire to live a healthy life	13	9%
PMTCT and to avoid transportation cost of subsequent hospital visits	5	4%
Scared of death	8	6%

No responds	4	3%
Total	138	100%

Reason for Late Initiation	Number Responded	Percentage
Wanted to confirm the results	10	24%
Could not believe I had HIV	10	24%
Wanted to go for prayers	6	14%
Needed time to think	4	10%
Was hospitalized	4	10%
Had to change facility due to familiarity with the staff	2	5%
No responds	6	14%
Total	42	100%

The main reasons given by most of the respondents 81% (n=108) for accepting early initiation was the desire to prevent Mother to child transmission of HIV (Table 6), need to stay healthy 9% (n=13), save cost of double transportation to the facility and being scared of dying from the disease.

For women who only accepted to initiate ART one week and above following diagnosis, reasons given were; the need to confirm the diagnosis 24% (n=10), the shock of accepting the diagnosis 24%(n=10) with some of them worried about starting ART in a familiar environment.

4. Discussion

A total of 180 HIV infected pregnant women were recruited into the study with a mean age of 28.9 years (SD=2.4years) with 68% (n=122) of them married. This result is similar to that reported in a study carried out in North East Ethiopia in 2015 and in the Kumba Health district in 2017 [10, 11]. Disaggregation by age is important as MTCT has been previously found to be significantly higher in adolescent mothers than in adult mothers [12]. Other studies found that women 25years and above were less likely to be lost to follow up in future [11]. In our study, of all the age groups, the proportion of women initiating early were more than those

initiating late except for women between the ages of 35-39 where more than half of them initiated late. This result is similar to findings by Landes *et al.* [13] in Malawi in 2016 where he explained that older women were more likely to be initiated later than younger women, even though these women were less likely to default than the younger women. This can be explained by the fact that older women take time to make important decisions as lifelong ARV treatment, but are more committed when they do [13]. Sixty two percent (n=112) of the study participants had completed at least secondary education while only 11.1% (n=20) of the participants were formally employed.

Late start of ANC has always been a problem especially in low-income countries [5]. Amongst the participants, 67% (n=120) started ANC during the second trimester of pregnancy while 24% (n=44) started in the third trimester. Similar results were obtained in the Fako Division in the South West Region of Cameroon in 2011, in Zimbabwe in 2013 and Babessi Sub Division in the North West Region of Cameroon in 2016 [5, 14, 15]. Starting ANC late, implies that the diagnosis of HIV is made late leaving limited time for good viral load suppression to take place to effectively prevent MTCT [16]. A total of 96% (n=172) of the respondents in our study were diagnosed through PMTCT services with just 4% (n=4) coming in through VCT and as referrals for confirmation of the HIV test. This shows the importance of integrating PMTCT services into ANC as it results in the diagnosis of most HIV positive pregnant women which has a major impact on PMTCT. The high yield can be explained by the relatively higher ANC uptake amongst HIV positive pregnant women. This can be attributed to the effective work carried out by the US-Government President Emergency Plan for Aids Relief (PEPFAR) funded HIV Free South West Project of the Cameroon Baptist Convention Health Board. The project has been involved in capacity building of staff to roll out Option B+ and Care and treatment units of the various health facilities and has been providing Technical assistance to

health facilities in the South West Region since the pilot phase of Option B+ in 2013 till date[10, 17]

In this study, 77% (n=138) of the respondents were those who had initiated ART early with 23% (n=42) initiated at least one week from the date of diagnosis. Out of the 138 respondents who were initiated early, 134 (97%) of them were initiated on the same day. This shows that much is done to ensure that most of the newly diagnosed HIV positive pregnant women are being initiated following their diagnosis as per the national guideline, but raises a worry as previous studies found out that most HIV positive pregnant women on ART who were LTFU were those who started treatment on the same day as diagnosis with the possibility that some of these women may not have started the treatment in the first place [7, 10, 18].

Following Univariate analysis done, four factors were found to have a statistically significant association to early and late initiation to ART in HIV positive pregnant women. But after carrying out a multivariate analysis, the study identified two factors; The study found that pregnant women who were diagnosed of HIV following an ANC visit were more likely to be initiated early that those who came in due to other illnesses or who were referred. This may be explained by the fact that women who came in through ANC were more conscious of their baby's health and so knowing that ART was going to prevent vertical transmission were more willing to start early. The reason given by most (81%) of these women for early initiation was PMTCT. Others apart from PMTCT were also concerned about their health. There is a possibility that a woman accepting to be initiated based on the need to prevent transmission only without considering her own health may be reluctant to continue if they think the risk of transmission is no longer there. Matthews *et al* in 2016 found that women initiating ART for their own health were more likely to be adherent and hence achieve viral suppression than for those doing it for PMTCT only[19]. Women who initiated late were also concerned about

PMTCT but were either shocked or were not convinced by the results and others were inpatients and were only initiated at the end of their treatment.

Women attending private health facilities were more likely to be initiated early than those attending state-owned health facilities. This could be explained by the policies in place. These private facilities had policies to ensure that all clients diagnosed were placed on treatment and given that all these facilities were faith based, they also had Social workers and Chaplains whose expertise were sought for women who were reluctant to be initiated.

5. Conclusion

Our study identified type of facility and events or reason for diagnosis as being associated with late initiation of ART in HIV positive pregnant women in the South West Region. The study also identified that the need to prevent MTCT of HIV was the main reason that motivated the choice of early initiation while the need to confirm test results was the main reason for women accepting initiation late. These factors identified will be important in policies aimed at improving uptake of ART among HIV positive pregnant women naïve to treatment. To effectively reduce MTCT in Cameroon, further research on the facilitators or early ANC and early ART initiation in Faith-Based hospitals is need scale up those facilitators in government-owned hospitals since about 70% of health facilities in the country are government-owned.

Data Availability

Data collected during the study are freely available on request.

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