

## Economic Factors Affecting Retention of HIV Patient on Treatment at Wuse General Hospital, Abuja, Nigeria

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### Abstract

The economic barriers to the retention of HIV patient on treatment is a challenge to optimal viral suppression. This study examined economic factors related to retention such as employment status, food insecurity and cost of transportation to health facility that may influence retention at Wuse General Hospital, Abuja. A retrospective cohort study design was used to access economic factors that influence the retention of HIV patients on treatment. A total of 240 clients were recruited, and a pre-tested interviewer-administered semi-structured questionnaire was used for data collection. Data were entered into Stata/MP 15.0 and then exported into SPSS version 23.0 for statistical analysis. Of the 240 respondents interviewed. The findings revealed that there is an association between socio-demographic and employment status and retention in care. The results show that younger ages (20-49), being males (64.1%) and unemployed (72.3%), are more likely to be associated with retention ( $p < 0.047$ ). The association between socio-economic characteristics of respondents and cost of travelling to facility ( $p = 0.016$ ) and rural of place residence ( $p = 0.000$ ) was statistically significant, respectively. This study also reveals that the cost of transportation less than N200 has significant relationships with retention in at the study site ( $p = 0.016$ ). To address the challenges related to travel distance to health facility and high transport cost, patients should be continually encouraged to access treatment at their nearest clinic of their choice. Linking unemployed HIV patients to economic empowerment programmes will help improve their economic status.

**Keywords:** Economic Factors, HIV/AIDS, Retention, Treatment.

### Introduction

The government of Nigeria was dedicated to ensuring that 90% of people living with HIV in Nigeria know their HIV status by the year 2020, in line with the UNAIDS 90-90=90 goals. This will enable 90% of those who know their HIV status to be placed on treatment, and 90% of those placed on treatment attained viral suppression.

There are an estimated 38.0 million persons

infected with HIV globally [1]. According to global AIDS statistics 2018 reveal that 68% of PLHIV are in Sub-Saharan Africa [2] and about 1.9 million in Nigeria [3]. Identifying people with HIV, linkage to HIV prevention and care services, early initiation on ART, and lifelong retention on treatment are key elements of the WHO/UNAIDS strategy towards achieving universal access to treatment for PLHIV. Retaining patients on treatment along the continuum of care in HIV programmes is

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critical to achieving optimal viral suppression, good clinical outcomes, and improved quality of life.

Various economic factors have been found to impact negatively on patient retention, including financial constraints in transportation fare to the ART clinic [4]. Travelling to the health facility for follow-up appointments to receive treatment has been recognized as a barrier to HIV care, timely initiation of antiretrovirals (ARVs) and adherence to ART [5]. Transportation costs, time not used for meaningful economic activities, and the costs of medical services have been reported to create barriers to care and treatment [6]. The cost of travelling for monthly appointments has been identified [7] as a potential barrier to antiretroviral (ARV) adherence and retention in care.

Previous studies from Africa have shown that distance to the clinic and difficulty in affording transportation is linked to poor ART adherence and lost to Follow Up [5, 6, 7, 8, 9]. Several aspects of transportation can be barriers to HIV care. A recent review [10] identified 4 aspects: (a) travel distance, (b) travel time, (c) transportation cost and (d) rural versus urban setting.

A review of previous study has shown that employed HIV-infected patients from low, middle and high-income countries are more likely to be retained in ART than unemployed patients. This is in agreement with the results of previous meta-analysis [11] and of others [12] who reported that one of the barriers to ART adherence in both developed and developing countries was financial constraints, which may be considered a proxy for unemployment. It is possible that employment facilitates adherence and retention to HIV treatment because it is associated with increased social support, better time management, and improved psychosocial well-being – these associations have all been documented in the general population [13].

Lack of economic empowerment is related to poverty and food insecurity, and these can

affect retention of PLHIV in ART in many ways. This is because some patients are forced to choose between paying for transportation to attend the ART clinic and using the money for food [14]. Choosing between paying for food and accessing medical treatment can also lead to missed appointments resulting to poor retention [15]. Lack of food also contributes to immunologic decline, which can reduce ART adherence [16].

To address the economic drivers of poor care and treatment outcomes, household economic interventions must be encouraged and implemented. Household economic interventions that support retention in care and medication adherence may contribute to better health outcomes for PLHIV and further reductions in the transmission of HIV [15, 17].

## **Materials and Methods**

A retrospective cohort study was employed to access factors affecting PLHIV retention in ART. An in-depth interview using semi-structured questionnaires was used to extract patient information on economic factors affecting retention of PLHIV in care and treatment. The interview was conducted with the consent of participants, and adequate privacy was maintained to ensure maximum Corporation.

### **Study Area**

This study was carried out in Wuse General Hospital, Abuja, Nigeria – a secondary health facility which is one of the ART sites in the Federal Capital Territory (FCT). It offers comprehensive HIV care services, including antiretroviral therapy (ART). The decision to choose this institution was because the hospital caters to a huge number of people on treatment for HIV and AIDS within Abuja town and its environs and has the required standard and capacity to offer optimal services. About 4,564 PLHIV patients have been enrolled on the ART programme in Wuse General Hospital since the inception of the ART programme in 2005.

Also, about 2,791 patients are currently accessing treatment as of June 2020. The facility provides comprehensive HIV services and laboratory services (CD4 count, viral load, haematology, and chemistry), adherence counselling, preventive services, HIV testing service (HTS), management of opportunistic infection (OIs), and adverse drug reactions. Patients who are infected with HIV are diagnosed at various counselling and test points in the hospital and are referred to an ART clinic in the hospital for commencement of treatment as recommended in the Nigerian National Treatment Guidelines. ART adherence counselling is offered at the initiation of treatment and subsequently through group counselling or individual counselling by trained adherence counsellors. During adherence counselling session, patients' commitments and adherence to treatment are emphasized before commenced on ART to optimize retention.

### Sample Size Determination

The sample size for the study was calculated using the formula below:

$$n = \frac{Z\alpha^2 \times P \times (1-P)}{d^2}$$

n = the sample size

Z $\alpha$  = standard error deviate at 95% confidence level = 1.962

p = The percentage of patients retained at 12 months was 81.2% (i.e., p=0.812) from a study on outcomes of Nigeria's HIV/AIDS treatment programme for patient-initiated on ART 2004-2012 [18].

q = 1-P

d = Precision = 5%

$$n = \frac{1.96^2 \times P \times (1-P)}{0.05^2}$$

$$n = \frac{1.962 \times 1.962 \times (0.812) \times (0.188)}{0.05^2} = 0.5876/0.05^2$$

Minimum sample size (n) = 235.04.

For a Population of less than 10, 000.

The formula  $n/(1+n/N)$  was used in the determination of the minimum sample size required.

Where:

N is the estimated study population that is less than 10,000, which is 3000 (obtained from the facility records).

n is the minimum sample size required for a population greater than 10,000.

Therefore,

$$235 / (1 + 235/3000)$$

$$235 / 1.078$$

$$= 218$$

10% of non-response rate of 22 was added, making a total of 240.

### Sampling Technique

A systematic random sampling technique was used to select participants for the study. The sampling units included PLHIV age 18 years and above who were retained on ART for at least 12 months prior to the study, including those that were lost to follow up who were contacted through phone calls for a scheduled appointment. From the list of patients attending each clinic day, PLHIV who met the inclusion criteria were consecutively recruited from the ART clinic into the study till the desired sample size was attained. Averagely, a total of 100 HIV clients attends the clinic per day; a total of 24 eligible patients was recruited per clinic day for 10 clinic days until the required sample size of 240 was achieved.

### Data Collection

A pre-tested interviewer-administered semi-structured questionnaire was used to collect data for this study. The semi-structured interviews allowed the study participants to give detailed information on the reasons why HIV and AIDS patients were not retained in treatment or lost to follow-up. The study instruments consist of sections on socio-demographic data, social and economic factors, drug history (side effects and adverse drug reactions), health system factor and patient-related factors that influenced retention, stigma, cost of transportation, accessibility and availability of services, family and social

support and mental health problems. The study participants were educated about the study, its benefits, and their consent were obtained before commencement of the study, and participants were assured of the confidentiality of their information.

### Data analysis

There was a general review of filled questionnaires, and data were cleaned, coded, and entered into Stata/MP 15.0 (Stata Corp LLC, Texas, United States). Data cleaning and complete checks of entered data were done to exclude incomplete, inaccurate, and double-entry before analysis. Electronic data backup was done using a flash drive. The data was then exported into SPSS version 23.0 (SPSS 2018 IBM Corp, New York, United States) for statistical analysis. Data were summarized using tables for key elements. Results were presented in tables for frequencies and

measures of central tendencies with the appropriate measure of dispersion. Univariate analysis was performed, showing frequencies, proportions, and mean. Bivariate analyses for associations between socio-demographic factors, patient or individual factors, social factors, economic and health institution factors, and retention were performed. The bivariate analysis included the use of the Chi<sup>2</sup> ( $\chi^2$ ) test or Fisher's exact test for statistical significance. Multivariate analysis using binary logistic regression was used to identify independent predictors that affect retention of PLHIV on treatment. The level of significance was set at 5%.

### Results and Discussion

A total of 240 participants were enrolled in the study. Table 1 below presents the summary of the socio-demographic characteristics of the study participants.

**Table 1.** Socio-demographic Characteristics of Respondents

Characteristics	Frequency	Percentage
<b>Age</b>		
20-29	74	30.8
30-39	92	38.3
40-49	57	23.8
50-59	13	5.4
60-69	4	1.7
<b>Mean</b>	34.4±10.2	
<b>Sex</b>		
Male	64	26.7
Female	176	73.3
<b>Education</b>		
No formal education	37	15.4
Primary	42	17.5
Secondary	89	37.1
Tertiary	72	30.0
<b>Marital status</b>		
Never married	94	39.2
Married	105	43.8
Separated/Divorced	20	8.3
Partner died	21	8.8
<b>Religion</b>		
Christianity	141	58.8

Islam	71	29.6
Traditional	28	11.7
<b>Ethnicity</b>		
Hausa	140	58.3
Yoruba	27	11.3
Igbo	73	30.4
<b>Employment Status</b>		
Unemployed	47	19.6
Self-Employed	88	36.7
Employed	36	15.0
Dependents	37	15.4
Full time housewife	32	13.3
<b>Total</b>	<b>240</b>	<b>100.0</b>

The female constitutes the higher number of respondents in the study, representing 176(73.3%). Most respondents, 89(37.1%), had secondary school level education and are married 105(43.8%). The age group of 30 – 39 years was most dominant among the study population (38.3%), followed by the age group 20 – 29 years (30.8%). On respondents' religion, the majority were Christians

141(58.8%), followed by Moslem's 71(29.6%) and traditionalists 28(11.7%). On ethnicity, Hausas constituted the bulk of the respondents 140 (58.3%), then Igbos 73 (30.4%) and Yorubas 27 (11.3%) was the least among the study population. Employment status showed that a high percentage of respondents, 88 (36.7%), were self-employed.

**Table 2.** Socio-economic Characteristics of Respondents

<b>Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Family</b>		
Living alone	61	25.4
Nuclear	92	38.3
Extended	76	31.7
Cohabiting	11	4.6
<b>Place of Residence</b>		
Rural	165	68.8
Urban	75	31.3
<b>Proximity to Facility (Km)</b>		
<50	88	36.7
50-200	10	4.2
200-400	55	22.9
401-500	29	12.1
>500	58	24.2
<b>Cost of Traveling to Facility</b>		
<N200	11	4.6
N201-N500	46	19.2
N501—N1,000	118	49.2
N1,001-N2,000	65	27.1

> N2,000	3	1.3
<b>Number of Visit to Facility per Month</b>		
Once	233	97.1
Twice	2	0.8
Three times	2	0.8
4 times	3	1.3
<b>Current Main Source of Subsistence (Financial Support)</b>		
From your income(s)	133	55.4
Support from family	47	19.3
Support from friends/partner	36	15.0
Social support (from charities, churches, pagodas, mass organizations, etc.)	24	10.0
<b>Total</b>	240	100.0

In the analysis of the socio-economic characteristics of the respondents shown in table 2, most of the respondents, 92 (38.3%), were from nuclear family; about 70% were living in a rural setting; almost half of the respondents (49.2%) spend between N600 –

N1, 000 for transportation to their clinic facility; more than 70% visit their facility once in a month, and most 133 (55.4%) claimed to have the main financial source of their livelihood from their personal come.

**Table 3.** Association between Socio-demographic Characteristics of Respondents and Retention

Characteristics	Overall Retention		X <sup>2</sup>	P-value
	Not affected	Affected		
	N (%)	N (%)		
<b>Age</b>				
20-29	31(41.9)	43(58.1)	12.499	0.014*
30-39	31(33.7)	61(66.3)		
40-49	21(36.8)	36(63.2)		
50-59	9(69.2)	4(30.8)		
60-69	4(100.0)	0(0.0)		
<b>Sex</b>				
Male	23(35.9)	41(64.1)	0.600	0.000
Female	73(41.5)	103(58.5)		
<b>Education</b>				
No formal education	15(40.5)	22(59.5)	0.028	0.999
Primary	17(40.5)	25(59.5)		
Secondary	35(39.3)	54(60.7)		
Tertiary	29(40.3)	43(59.7)		
<b>Marital status</b>				
Never married	39(41.5)	55(58.5)	1.597	0.660
Married	44(41.9)	61(58.1)		
Separated/Divorced	7(35.0)	13(65.0)		
Partner died	6(28.6)	15(71.4)		
<b>Religion</b>				
Christianity	48(34.0)	93(66.0)	5.092	0.078

Islam	34(47.9)	37(52.1)		
Traditional	14(50.0)	14(50.0)		
<b>Ethnicity</b>				
Hausa	57(40.7)	83(59.3)	0.528	0.768
Yoruba	12(44.4)	15(55.6)		
Igbo	27(37.0)	46(63.0)		
<b>Employment status</b>				
Unemployed	13(27.7)	34(72.3)	9.652	0.047
Self-Employed	31(35.2)	57(64.8)		
Employed	21(58.3)	15(41.7)		
Dependents	16(43.2)	21(56.8)		
Full time housewife	15(46.9)	17(53.1)		
<b>Family</b>				
Living alone	26(42.6)	35(57.4)	5.119	0.163
Nuclear	32(34.8)	60(65.2)		
Extended	36(47.4)	40(52.6)		
Cohabiting	2(18.2)	9(81.)		
<b>Total</b>	96(40.0)	144(60.0)		

\*Fisher's exact test, significant at  $p < 0.05$

The analysis represented in table 3 provides the table of association between socio-demographic characteristics of respondents and factors affecting retention, which reveals a significant relationship between variables (sex, age, and employment status) and factors affecting retention ( $p < 0.05$ ). From the study, unemployment has a significant association with retention of PLHIV on treatment ( $p < 0.05$ ). Previous studies revealed that the unemployed have poorer health than the employed [19, 20]. Numerous meta-analyses and longitudinal studies showed that unemployment has a negative impact on health [21]. It is reported that employment promotes material well-being, for example, by improving food security, housing quality and reducing poverty. All three are known to be associated with adherence to HIV treatment and retention in care [12, 22, 23]. Poverty also correlates with food insecurity, and this can affect adherence in multiple ways. This is similar to previous studies that showed poverty and economic

insecurity are barriers to access to HIV care and treatment services [15]. In a study in South Africa, patients lost to follow-up who were later tracked consistently reported finances as a limiting factor to care [24]. When there is hunger as a result of lack of food or food insecurity, PLHIV may choose not to keep to an appointment or take their medications but rather go out in search of daily meals [23]. Previous studies have raised concerns about the widespread poverty and food insecurity at the household level and their effects on long-term retention in care. In settings with a high prevalence of HIV infection, women are more likely than men to access both treatment and other supportive services, such as targeted counselling and programmes for the prevention of mother-to-child HIV transmission offered by antenatal services [25]. On the other hand, men may appear to have better access to employment than women, and employment could facilitate increased adherence among men [26].

**Table 4.** Association between Socio-economic Characteristics of Respondents and Factors affecting Retention

Characteristics	Overall Retention		X <sup>2</sup>	P-value
	Not affected	Affected		
	N (%)	N (%)		
<b>Place of Residence</b>				
Rural	57(34.5)	108(65.5)	6.545	0.000
Urban	39(52.0)	36(48.0)		
<b>Proximity to Facility (km)</b>				
<50	37(42.0)	51(58.0)	7.734	0.102
50-200	4(40.0)	60(60.0)		
200-400	28(50.9)	27(49.1)		
401-500	12(41.4)	17(58.6)		
>500	15(25.9)	43(74.1)		
<b>Cost of Traveling to Facility</b>				
<N200	5(62.5)	3(37.5)	12.225	0.016*
N201-N500	16(34.8)	30(65.2)		
N501—N1,000	39(33.1)	79(66.9)		
N1,001-N2,000	33(50.8)	32(49.2)		
> N2,000	3(100.0)	0.(0.0)		
<b>Number of Visits to Facility per Month</b>				
Once	95(40.8)	138(59.2)	3.475	0.324*
Twice	1(50.0)	1(50.0)		
Three times	0(0.0)	2(100.0)		
4 times	0(0.0)	3(100.0)		
<b>Current Main Source of Subsistence (Financial Support)</b>				
From your income(s)	55(41.4)	78(58.6)	2.521	0.472
Support from family	20(42.6)	27(57.4)		
Support from friends/partner	15(41.7)	21(58.3)		
Social support (from charities, churches, pagodas, mass organizations, etc.)	6(25.0)	18(75.0)		
<b>Total</b>	96(40.0)	144(60.0)		

\*Fisher’s exact test, significant at  $p < 0.05$

As illustrated in table 4; the table of association on the socio-economic characteristics of the respondents shows a significant relationship only with the place of residence ( $p=0.000$ ) and cost of travelling to the facility ( $p=0.016$ ). The results showed that rural PLHIV and the high cost of transportation have a significant effect on PLHIV retention on treatment.

High costs of transportation, time away from productive economic activities, and the costs of

other medical services create barriers to care and treatment. This is partly due to the long distances covered by PLHIV from their residence to access health services due to fear of identification and stigmatization. This study reveals that the cost of transportation less than two hundred naira (N200) has significant relationships with PLHIV retention on treatment and care at the study site. This corroborates previous findings that individuals residing in locations with higher transportation



costs to the clinic have poorer retention than those who had lower costs. In rural Malawi, 35% of patients who were lost to care and traced back reported the high cost of transport to the clinic as the reason for absence [26]. A previous study also reported that if travel time to the clinic exceeded 2 hours, the risk of non-retention doubled [26].

## Conclusion

In this study, economic factors such as unemployment and cost of transport have a significant influence on the retention of PLHIV in the study site. It is also necessary to strengthen the decentralization of HIV services so that stable patient can pick their drug refill or access care and treatment at the facility nearest to them to reduce the cost of travelling to a health facility. Employment support interventions should be considered within the programme to encourage PLHIV retention in care. Strengthening economic factors will help to optimize PLHIV retention in treatment and

supportive HIV services in Wuse General Hospital.

## Conflict of Interest

There is no conflict of interest in this study

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## References

- [1] Global HIV & AIDS statistics — 2020 fact sheet. <https://www.unaids.org/en/resources/fact-sheet>.
- [2] Global HIV and AIDS statistics. Avert. 2015. <https://www.avert.org/global-hiv-and-aids-statistics>.
- [3] NAISS, 2018, Results and Implications for Nigeria's HIV Program. IHP. 2019. <https://www.internationalhealthpolicies.org/blogs/the-2018-nigeria-hiv-aids-indicator-and-impact-survey-naiss-results-and-implications-for-nigerias-hiv-program/>.
- [4] Janssen, S., Wieten, R.W., Stolp S., Cremers, A.L., Rossatanga, E.G., and Klipstein-Grobusch, K., 2015, Factors associated with retention to care in an HIV clinic in Gabon, Central Africa. *PLoS One*, 10(10): e0140746.
- [5] Taylor, B.S., Garduño, L.S., Reyes, E.V., Valiño, R., Rojas, R., and Donastorg, Y., 2011, HIV care for

geographically mobile populations. *Mt Sinai J Med J Transl Pers Med*, 78(3):342–351.

- [6] Weiser, S., Wolfe, W., Bangsberg, D., Thior, I., Gilbert, P., and Makhema, J., 200, Barriers to antiretroviral adherence for patients living with HIV infection and AIDS in Botswana. *JAIDS-HAGERSTOWN MD*, 34(3):281–288.

- [7] Tuller, D.M., Bangsberg, D.R., Senkungu, J., Ware, N.C., Emenyonu, N., and Weiser, S.D., 2010, Transportation costs impede sustained adherence and access to HAART in a clinic population in southwestern Uganda: a qualitative study. *AIDS Behav*, 14(4):778–784.

- [8] Olupot-Olupot, P., Katawera, A., Cooper, C., Small, W., Anema, A. and Mills, E., 2008, Adherence to antiretroviral therapy among a conflict-affected population in Northeastern Uganda: a qualitative study. *Aids*, 22(14):1882–1884.

- [9] Senkomago, V., Guwatudde, D., Breda M., and Khoshnood, K., 2011, Barriers to antiretroviral

- adherence in HIV-positive patients receiving free medication in Kayunga, Uganda. *AIDS Care*, 23(10):1246–1253.
- [10] Lankowski, A.J., Siedner MJ, Bangsberg D.R., and Tsai A.C., 2014, Impact of geographic and transportation-related barriers on HIV outcomes in sub-Saharan Africa: a systematic review. *AIDS Behav*, 18(7):1199–1223.
- [11] Nachega, J.B., Uthman, O.A., Mills, E.J., and Peltzer, K., 2013, The impact of employment on HIV treatment adherence.
- [12] Mills, E.J., Nachega, J.B., Bangsberg, D.R., Singh, S., Rachlis, B., and Wu, P., 2006, Adherence to HAART: a systematic review of developed and developing nation patient-reported barriers and facilitators. *PLoS Med*. 3(11): e438.
- [13] Sousa-Ribeiro, M., Sverke, M., and Coimbra, J.L., 2014, Perceived quality of the psychosocial environment and well-being in employed and unemployed older adults: the importance of latent benefits and environmental vitamins. *Econ Ind Democr*, 35(4):629–652.
- [14] Mukumbang, F.C., Mwale, J.C., and Van Wyk B., 2017, Conceptualising the factors affecting retention in care of patients on antiretroviral treatment in Kabwe District, Zambia, using the ecological framework. *AIDS Res Treat*.
- [15] Swann, M., 2018, Economic strengthening for retention in HIV care and adherence to antiretroviral therapy: A review of the evidence. *AIDS Care*, 30(sup3):99–125.
- [16] Kalichman, S.C, Grebler, T., Amaral, C.M., McKerney, M., White, D., and Kalichman, M.O., 2014, Food insecurity and antiretroviral adherence among HIV positive adults who drink alcohol. *J Behav Med.*, 37(5):1009–1018.
- [17] Haberer, J.E, Sabin, L., Amico, K.R., Orrell, C., Galárraga, O., and Tsai, A.C., 2017, Improving antiretroviral therapy adherence in resource-limited settings at scale: a discussion of interventions and recommendations. *J Int AIDS Soc*, 20(1):21371.
- [18] Dalhatu I, Onotu D, Odafe S, Abiri O, Debem H, Agolory S, Shiraishi RW, Auld AF, Swaminathan M, Dokubo K, Ngige E, Asadu C, Abatta E, Ellerbrock., 2016, Outcomes of Nigeria’s HIV/AIDS Treatment Program for Patients Initiated on Antiretroviral Treatment between 2004-2012
- [19] Pelzer, B., Schaffrath, S., and Vernaleken I., 2014, Coping with unemployment, The impact of unemployment on mental health, personality, and social interaction skills. *Work*, 48(2):289–295.
- [20] Van Hal, G., 2015, The true cost of the economic crisis on psychological well-being: a review. *Psychol Res Behav Manag*, 8:17.
- [21] Murphy, G.C., and Athanasou J.A., 1999, The effect of unemployment on mental health. *J Occup Organ Psychol*, 72(1):83–99.
- [22] Milloy, M-J, Kerr, T., Bangsberg, D.R., Buxton J., Parashar S., and Guillemi, S., 2012. Homelessness as a structural barrier to effective antiretroviral therapy among HIV-seropositive illicit drug users in a Canadian setting. *AIDS Patient Care STDs*, 26(1):60–67.
- [23] Young, S., Wheeler A.C., McCoy S.I., and Weiser, S.D., 2014, A review of the role of food insecurity in adherence to care and treatment among adult and pediatric populations living with HIV and AIDS. *AIDS Behav*, 18 Suppl 5: S505-515.
- [24] Maskew, M., MacPhail, P., Menezes C., and Rubel D., 2007, Lost to follow up – contributing factors and challenges in South African patients on antiretroviral therapy, 97(9):5.
- [25] Braitstein, P., Boulle, A., Nash, D., Brinkhof, M.W., Dabis, F., and Laurent, C., 2008, Gender and the use of antiretroviral treatment in resource-constrained settings: findings from a multicenter collaboration. *J Women’s Health*, 17(1):47–55.
- [26] Puskas, C.M, Forrest, J.I., Parashar, S., Salters, K.A., Cescon A.M. and Kaida A., 2011, Women and vulnerability to HAART non-adherence: a literature review of treatment adherence by gender from 2000 to 2011. *Curr HIV/AIDS Rep*, 8(4):277–287.