

Prevalence and Determinants of Adherence to Highly Active Antiretroviral Therapy (HAART) amongst a Cohort of HIV Positive Women Accessing Treatment in a Tertiary Health Facility in Southern Nigeria

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Abstract

Background: Optimal adherence to HAART amongst women living with HIV/AIDS (WLHIV) accounts for more than half of all new infections worldwide. This is particularly crucial for the success of HIV/AIDS treatment programs. In Nigeria, adherence amongst women has remained largely unexplored. This study aims to determine the prevalence and determinants of adherence to HAART amongst HIV positive non-pregnant women receiving treatment in a tertiary health facility in Cross River State, Nigeria.

Method: A cross-sectional study was conducted amongst non-pregnant HIV positive women on HAART attending the Special treatment clinic of the University of Calabar Teaching Hospital between December 2012-February 2013. A consecutive sample of 282 eligible WLHIV was enrolled into the study. A semi-structured interviewer-administered questionnaire was used to elicit information on self-reported adherence from the respondents. Adherence was defined as the consistent use of at least 95% of prescribed doses the week preceding the study. Summarization of data was done using frequencies/proportions while exploration of categorical variables was performed using the chi square test. Independent predictors of adherence to HAART were determined by binary logistic regression and significance level was set at $p < 0.05$.

Results: The mean age of WLHIV was 33.6 ± 8.5 years. The overall self-reported adherence rate in this study was 59.6%. Being busy, forgetting to take medications, felt depressed, and inconvenient timing were the main reasons cited by respondents for skipping doses. The independent risk factors for adherence to HAART included: nonpayment for ART services [OR 2.30; 95% CI: 1.02-5.10] Increased transport costs [OR 2.0; CI: 1.16-2.72], improved perceived health status [OR 2.45; CI: 1.90-5.03], and fewer number of children [OR 2.22; 95% CI: 1.21-4.09] and were the positive determinants of adherence to HAART. Conversely, increased pill load significantly decreased the likelihood of adherence to HAART. [OR 0.62; 95% CI: 0.41-0.94.]

Conclusion: With about two-fifths of the study population reporting inconsistencies in adhering to HAART, the adoption of appropriate adherence enhancing strategies directed at ensuring an uninterrupted access to free ART services and reducing pill load is strongly recommended.

Keywords: Adherence; Women; HIV/AIDS; HAART; Nigeria

Abbreviations: AIDS: Acquired Immune Deficiency Syndrome; ART: Antiretroviral Therapy; HAART: Highly Active Antiretroviral Drugs; PEPFAR: President's Emergency Plan for AIDS Relief; HIV-Human Immunodeficiency Virus; PMTCT-Prevention of Maternal to Child Transmission; PLHIV-People Living with HIV/AIDS; UCTH-University of Calabar Teaching Hospital; USAID: United States Agency for International Development.

Introduction and Background

In 2010, an estimated 33.3 million persons are infected with the Human Immunodeficiency Virus (HIV) globally; of these, 68% live in sub Saharan Africa where more than 60% of People Living with HIV/AIDS (PLHIV) are women, disproportionately affected by the HIV-1 epidemic for both biological and socio-cultural reasons [1-3]. Nigeria currently has one of the highest HIV burden worldwide, with 3.1 million PLHIV and about 215,000 annual AIDS deaths [4,5]. Females constituted 58% (about 1.72 million) of PLHIV and each year 55% of AIDS death occurs among women. This has been attributed to gender equality issues and societal factors that put women at risk of developing HIV/AIDS [6].

The health condition of PLHIV has improved significantly with the introduction and widespread use of Anti-Retroviral Therapy (ART). ART has also remained the only available option that offers the possibility of dramatically reducing HIV/AIDS-related morbidity and mortality and has subsequently led to the scaling up of treatment/preventive programs especially in developing countries. In Nigeria, as part of the response to the raging HIV/AIDS epidemic, the government in partnership with international collaborators in 2002, established the National Ant Retroviral Therapy (ART) Program which further improved access to HIV care and treatment [7]. The total number of PLHIV on ART steadily increased from 50,581 at the early stages of ART initiation in Nigeria in 2005 to 302,973 in 2009 [5]. So far, these efforts still remain sub-optimal as only one-third of individuals requiring treatment in Nigeria have access to ART [5]. With increased access to treatment, and programs launched to provide free Highly Active Antiretroviral Therapy (HAART), successful long-term treatment of HIV requires sustainable high rates of adherence to the HAART regimen [8-10]. Adherence rates of at least 95% are considered appropriate to maximise the benefits of HAART [11-14], in improving virological, clinical and immunological outcomes [14-16]. Incomplete medication adherence has been strongly correlated with treatment failure, disease progression and development of drug resistance [17,18].

Furthermore, although women are more likely to seek health-care and initiate HAART earlier than men [3,19] they may be more likely to show incomplete adherence and discontinue HAART during therapy [20]. Adherence to HAART amongst women may be compromised by child-care responsibilities and dependency ratios [21,22] economic pressures and lack of partner support [22,23]. Inconsistent adherence to HAART increases women's risk of virologic failure and subsequent clinical progression. This study was therefore conducted to document adherence patterns and factors associated with adherence amongst women who have been disproportionately affected by the HIV/AIDS epidemic especially in a resource constrained settings like ours at the University of Calabar Teaching Hospital, Calabar Nigeria. There is paucity of information regarding adherence patterns amongst women in Nigeria. This study was therefore necessary to fill the knowledge gap and develop appropriate adherence enhancing strategies.

Materials and Methods

The study was conducted at the Special treatment clinic of the University of Calabar Teaching Hospital (UCTH), Calabar Nigeria (formerly called the President's Emergency Plan For AIDS Relief (PEPFAR) clinic). In June 2005, the Hospital was chosen as a centre by the United States Agency for International Development (USAID) for the implementation of PEPFAR. It is a major centre responsible for the provision of care and support services for PLHIV in Cross River and other neighbouring states.

Study Population

The study population comprised of 282 non-pregnant HIV positive female patients who had commenced HAART at the UCTH from December 2012 - February 2013. All HIV positive consenting women who were eligible to participate were consecutively recruited over the study period till the attainment of required sample size.

The exclusion criteria included; male patients, ART-naïve patients, terminally ill female patients, pregnant women and non-consenting patients. The inclusion criteria adopted for the study included; consenting female patients diagnosed and confirmed to be HIV positive, at least 18 years of age and had been on HAART for 3 months.

Study design

A cross-sectional analytical study was conducted among WL-HIV on HAART.

Data collection instrument

An interviewer-administered semi-structured questionnaire was designed and used to collect pertinent information on socio-demographic profile, clinical and treatment variables including treatment experiences, reasons for nonadherence, and support received. Patient's self-report was used to determine adherence to HAART in the week preceding the interview. A self-report tool for screening adherence and barriers (The Brief Medication Questionnaire) was used to collect adherence data [24]. The degree of adherence was calculated based on the formula:

% Adherence over last 7 days =

$$\frac{\# \text{ doses should have taken} - \# \text{ missed doses} \times 100\%}{\# \text{ Doses should have taken}} \quad [25]$$

For the purpose of this study a score of $\geq 95\%$ represented good adherence while $< 95\%$ was rated as having poor/ sub-optimal adherence.

Data analysis

SPSS for Windows version 19.0 was used for data analysis. Descriptive and inferential statistical tests were employed. Descriptive statistics (frequencies, proportions, means and standard deviation) were first used to summarize variables

while inferential statistics bivariate (chi-square) and multivariate (logistic regression) analysis was used to determine significant correlates and predictors of adherence. The level of significance was set at $p < 0.05$. Logistic regression analysis was used to identify the independent risk factors of adherence. Variables found to be significant at 10% after performing bi-variate analysis, were entered into a logistic model and predictors were determined at 5% significance.

Ethical clearance and consent

The study procedures and data collection instruments were reviewed and approved by The Health Research Ethical Committee of the University of Calabar Teaching Hospital. Permissions were obtained from the Head, Family Medicine department where the clinic is domiciled and the Chief Nursing Officer before commencement of the study. Written informed consents were obtained from all women for the use of their data for the study.

Results

Two hundred and eighty-two eligible female respondents attending the Special treatment clinic UCTH and receiving treatment were studied. Overall mean age of respondents was 33.6 ± 8.5 years. The largest proportion of HIV positive women 137(48.6%) were in the age group 25-34years. The majority

Characteristics	Frequency N=282	Percentage
Age (years)		
<25	28	9.9
25-34	137	48.6
35-44	86	30.5
45-54	22	7.8
>55	9	3.2
Mean \pm SD	33.6 \pm 8.5	
Marital Status		
Single	84	29.8
Married	138	48.9
Divorced/separated	26	9.2
Widowed	34	12.1
Level of education		
None	14	5
Primary	49	17.4
Secondary	112	39.7
Tertiary	107	39.7
Employment status		
Employed	214	75.9
Unemployed	68	24.1
Average Monthly income		
\geq N 19,000 (\$118.75)	217	77
> N 19,000 (\$118.75)	65	23

Table 1: The Socio-demographic characteristics of study participants (n=282)

of those interviewed were currently married, 138 (48.9%) and more than a third 39.7 % had attained either secondary or Tertiary education. Most, 214 (75.9%) were currently employed but more than three-quarters, 217 (77.0%) earned less than <N19,000 (\$118.75) monthly, which is less than the minimum monthly wage in Nigeria. Christianity was the predominant religion (Table 1).

Variable	Frequency (N=282)	Percentage
Number of children		
None	83	29.4
1-3	150	53.2
4-6	38	13.5
>6	11	3.9
Spousal status		
Positive	52	18.4
Negative	230	81.6
Household size		
≤ 5	214	75.9
>5	68	24.1
Living arrangement		
Alone	42	14.9
With others	240	85.1
Disclosed HIV status		
Yes	261	92.6
No	21	7.4
Perceived social support		
Present	198	70.2
Absent	84	29.8
Belongs to a Support group		
Yes	48	17
No	234	83

Table 2: Family characteristics of study participants including support (n=282)

The family characteristics of respondents are as presented in Table 2. More than half 150 (53.2%) had at least 3 children and 214 (75.9%) with at most 5 people in their households. Furthermore, majority, 240 (85.1%), of the respondents were not living alone, 261 (92.6%) had disclosed their HIV status and 198 (70.2%) received support from family and friends. However, less than a fifth, 48 (17.0%) were members of a HIV support group and only 52 (18.4%) had spouses who were also HIV positive.

The Medical profile of respondents interviewed (Table 3) revealed that more, 147 (52.1%) had been on HAART for over 24 months. The median duration on HAART was 24 months (inter-quartile range 24-44.8 months). Over two-fifths of the study population, 129 (45.7%) had experienced side effects while on HAART and majority, 189 (67.0%) reported non use of traditional herbal remedy alongside HAART.

Variable	Frequency N=282	Percentage
Treatment duration (months)		
<24	135	47.9
≥ 24	147	52.1
Median duration on Treatment	24(IQR 24 - 44.8)	
Number of pills per day		
≤2	195	69.1
>2	87	30.9
Side effects		
Yes	129	45.7
No	153	54.3
Herbal remedies		
Yes	93	33
No	189	67
Perceived health status Rating		
Good	265	94
Fair/poor	17	6
Paid for ART services		
Yes	26	9.2
No	256	90.8
Transportation cost to Health facility		
< N 1000(\$ 6.25)	204	72.3
≥ N 1000(\$ 6.25)	78	27.7

Table 3: Medication/treatment variables including treatment experiences (n=282)

In addition, more than three-fifths of the WLHIV 195 (69.1%) were on 2 pills daily and most, 265 (94.0%) reported experiencing an improved health status since their placement on HAART. Also, most of the patients, 204 (72.3%) reportedly spent less than N1,000 (\$ 6.25) on transportation to the health facility and less than a tenth 26 (9.2%) paid for services at the treatment site.

Optimal adherence to HAART (≤95%) was achieved by more than half 168 (59.6%) of the respondents interviewed. Being busy (39.7%) was the commonest reason given for nonadherence. This was followed by simply forgetting medications (33.7%), depression (19.1%), inconvenient timing for medications schedule (12.1%) and fear of being discovered (11.7%) (Figure 1).

Bivariate analysis revealed the following factors as significantly associated with adhering to HAART (Table 4 and 5): having fewer children (≤ 5), obtaining free ART services, perceiving one's health status improved, not encountering side effects and paid more than N1,000 on transportation to the health care facility ($p < 0.05$).

The predictors of adherence to HAART amongst HIV positive women accessing treatment in the Special treatment clinic UCTH (Table 6) were: obtaining free ART services, perceived

improved health status, reduced pill load, and having fewer children. However, WLHIV who spent more on transportation to health facility were more likely to adhere to their prescribed doses compared with those who spent less.

Characteristics	Good Adherence (N=168) Frequency (%)	Poor Adherence (N=114) Frequency (%)	Significance
Age (years)			
≤35	98(59.4)	67(40.6)	p= 0.94
>35	70(59.8)	47(40.2)	$\chi^2 = 0.01$
Marital status			
Married	85(59.0)	59(41.0)	p= 0.85
Not married	83(60.1)	55(39.9)	$\chi^2 = 0.04$
Level of Education			
< Secondary	34(54.0)	29(46.0)	p=0.30
≥Secondary	134(61.2)	85(38.8)	$\chi^2 = 1.06$
Children Number			
≤ 5	162(61.1)	103(38.9)	p=0.04
>5	6(35.3)	11(64.7)	$\chi^2 = 4.43$
Spousal status			
Positive	34(65.4)	18(34.6)	p=0.34
Negative	134(58.3)	96(41.7)	$\chi^2 = 1.35$
Household size			
≤ 5	130(60.7)	84(39.3)	p=0.48
>5	38(55.9)	30(44.1)	$\chi^2 = 0.51$
Living arrangement			
Alone	15(35.7)	27(64.3)	p= 0.50
With others	99(41.3)	141(58.8)	$\chi^2 = 0.46$
Occupation			
Employed	85(39.7)	129(60.3)	p= 0.67
Not employed	29(42.6)	39(57.4)	$\chi^2 = 0.18$
Average monthly income			
≤ N19,000	129(59.4)	88(40.6)	p=0.94
>N19,000	39(60.0)	26(40.0)	$\chi^2 = 0.01$
Perceived social support			
Yes	124(62.6)	74(37.4)	p=0.11
No	44(52.4)	40(47.6)	$\chi^2 = 2.57$
Disclosed status			
Yes	103(39.5)	158(60.5)	p=0.25
No	11(52.4)	10(47.6)	$\chi^2 = 1.35$

Table 4: Distribution of socio-demographic characteristics of the study participants by their ART adherence pattern

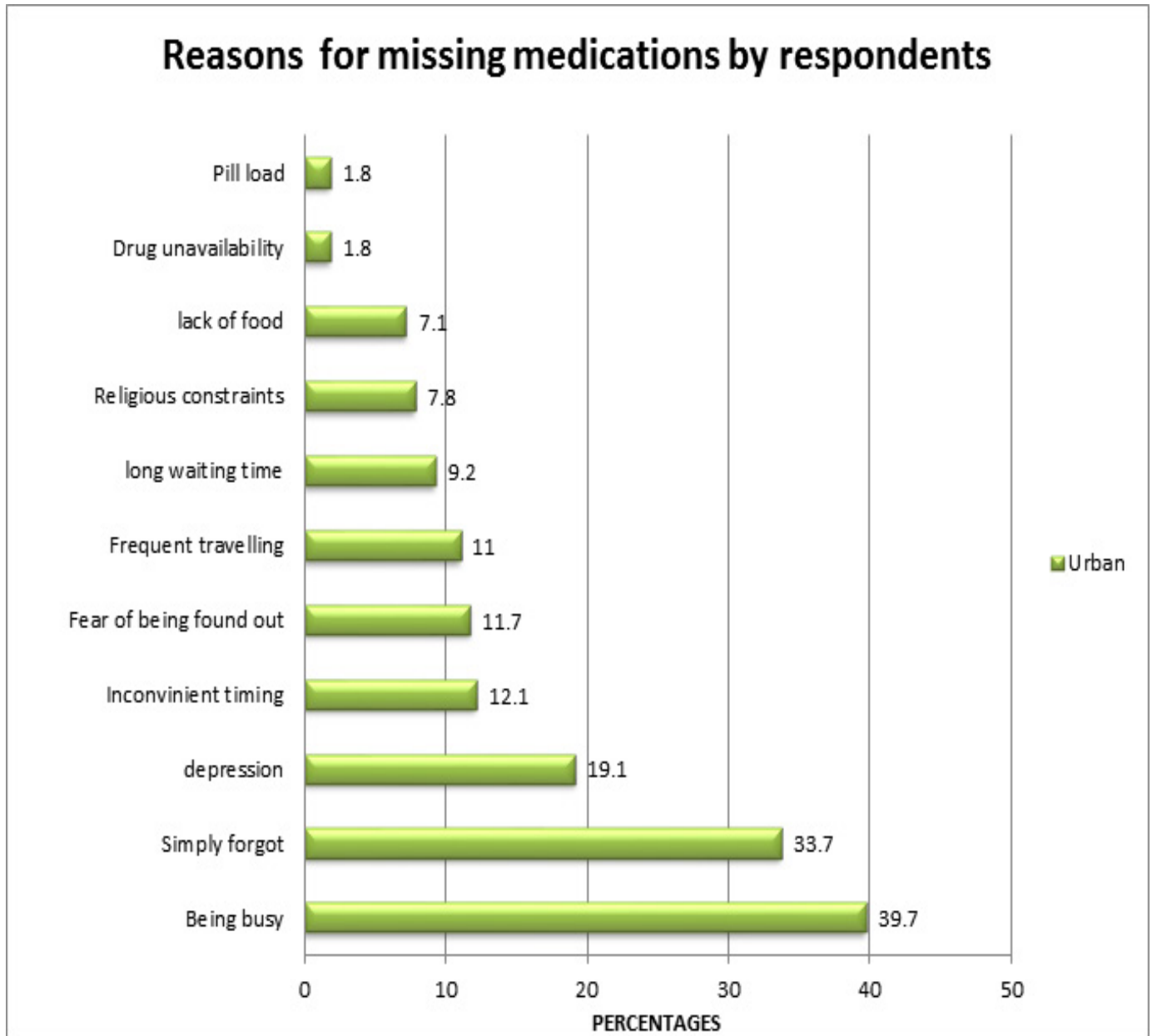


Figure 1: Reasons for missing medications by respondents

Discussion

This cross-sectional study aimed to contribute towards addressing gaps in knowledge regarding the prevalence and determinants of adherence to HAART amongst a cohort of HIV positive women receiving treatment in a Tertiary health facility in Cross River state, Nigeria. Adherence to effective ARV therapy has been strongly correlated with HIV suppression reduced rates of resistance increase in survival and improved quality of life [16,26].

Adherence to HAART was reported in 59.6% of the population studied. This finding was consistent with other studies done in Nigeria and an African setting [25, 27-29], but slightly higher than earlier reports 30-34 although, these studies included both sexes, females constituted a majority of the study

population. This has serious implications for the success of the HIV treatment programs in Nigeria where slightly over 40% of the population most vulnerable to the HIV/AIDS epidemic are unable to attain optimal adherence rates.

Missing or skipping doses among study participants was associated with being busy and simply forgetting medications. These two reasons, have been consistently mentioned in other studies [25, 27, 29, 32, 35,36] as the main risk factors for poor adherence. This may be attributed to the numerous roles women play in caring for the family. Women in most African countries may also be saddled with numerous responsibilities like caring for aged parents and relatives, thereby leaving them with little or no time to care for themselves or remember their medications.

Characteristics	Good Adherence (N=168) Frequency (%)	Poor Adherence (N=114) Frequency (%)	Significance
Treatment duration			
< 24	78(57.8)	57(42.2)	p= 0.85
≥ 24	90(61.2)	57(38.8)	$\chi^2= 0.04$
Number of pills/day			
≤ 2	112(57.4)	83(42.6)	p=0.27
>2	56(64.4)	31(35.6)	$\chi^2= 1.20$
Side effects			
No	85(65.9)	44(34.11)	p=0.04
Yes	83(54.2)	70(45.8)	$\chi^2= 3.94$
Used Herbal remedies			
No	119(63.0)	70(37.0)	p=0.98
Yes	49(52.7)	44(47.3)	$\chi^2= 2.73$
Paid for ART services			
No	158(61.7)	98(38.3)	p= 0.02
Yes	10(38.5)	16(61.5)	$\chi^2=5.30$
Transport cost			
< N1000	114(55.9)	90(44.1)	p=0.04
≥N1000	54(69.2)	24(30.8)	$\chi^2=4.18$
Perceived Health status			
Fair/ poor	6(35.3)	11(64.7)	p=0.03
Good	162(61.1)	103(38.9)	$\chi^2=4.45$
Belongs to HIV support group			
Yes	27(56.3)	21(43.8)	p=0.61
No	141(60.3)	93(39.7)	$\chi^2 = 0.27$

Table 5: Distribution of Medical profile/ treatment experiences of the study participants by their ART adherence pattern (n=282)

Factors associated with Adherence to HAART

Having fewer children was found to be associated with better adherence in this study. This finding was in agreement with a similar study done in Ethiopia which demonstrated as a significant predictor not having dependants. The odds of not having dependants was 1.95 higher than those who had dependants [37]. The reason may be that women who had many children may likely forget their pills because of their busy schedules or due to stress of caring for their children or members of their family. Also another common reason for poor adherence was forgetting. These reasons may further buttress this point.

Limiting pill number to two daily and dosing schedule to once or twice daily has been found to yield a better adherence [16]. Respondents taking more than two pills daily had a reduced likelihood of adhering to treatment compared to those on at least two pills per day. This finding was also reported by similar studies [38,39] where pill burden reportedly had a strong impact on adherence. Similarly, the attainment of 100% adher-

Independent Variable	Odds ratio	95% confidence interval	p- value
Number of children			
≤ 5	2.22	1.21- 4.09	0.01
>5	1		
Paid for ART services			
No	2.3	1.02- 5.10	0.04
Yes	1		
Pill number			
>2 pills/day	0.62	0.41-0.94	0.02
≤ 2pills /day	1		
Description of perceived health status			
Good	2.45	1.90-5.03	0.015
Fair/poor	1		
Encountered side effects			
Yes	0.77	0.55-1.08	0.13
No	1		
Transportation costs			
≥ N 1000 (\$ 6.25)	2	1.16-2.72	0.008
<N 1000(\$ 6.25)	1		

Table 6: Binary logistic regression analysis of predictors for good adherence

ence rate was observed in patients taking fewer pills as demonstrated by Cauldbeck et al in India. This could be attributable to the fact that women probably because of their busy schedules may not be able to incorporate a complex drug schedule into their day to day activity or may simply forget their medications [40].

Furthermore, obtaining free treatment at ART clinics was a significant predictor of adherence to treatment. Women adherers compared to those paying for services. This was in keeping with studies done in the south western Nigeria [41], and in Kenya [42]. Although drugs are being given free of charge in most health facilities offering ART services in Nigeria, patients are still required to pay some user fees at health facilities. e.g. opening of folders, and certain laboratory investigations. Also there are some indirect costs these patients bear e.g. transportation costs.

In addition perception of one's health status as improved was a motivator for adherence as seen in this study. WLHIV who perceived their health status as improved following commencement on HAART were more adherent compared to those who perceived their health as not improved. This finding was in agreement with previous report by Malcom and colleagues [43], but at variance with a study done in southern Nigeria which reported that good health was a risk factor for non-adherence where patients tend to abandon treatment once their health status improved [25].

Social support has been demonstrated by Ambebier and colleagues in Ethiopia as a significant predictor of adherence [35]. Surprisingly, perceived social support and disclosure of

one's HIV status were not associated with adherence in this study. This finding is in contrast to findings from other studies conducted in Ethiopia [35,44,45] where greater social support predicted not only better adherence, but also a more consistent adherence. Another recent report amongst pregnant HIV positive women by Ekama et al. [46] in Lagos (south western Nigeria) demonstrated that disclosure of one's HIV status was associated with good adherence and ultimately resulted in better support. This was however not the case with our study. Similarly, membership of a HIV support group did not have any impact on adherence amongst the study population. This was contrary to findings observed in a study done in South-western Nigeria where attendance of support group meetings improved adherence [41]. This could be attributable to the fact the support groups were probably focusing more on income generating activities without emphasizing the treatment goal for every HIV client placed on HAART. This study also revealed that less than a fifth of WLHIV were members of a support group. This may be linked with their busy schedules or issues related to stigmatization where women were afraid of being found out if they attended meetings.

Finally, a higher cost of transportation to the Health facility was associated with optimal adherence to HAART. This was quite odd and the reason for this is not clear. The fact that they had to pay more for transportation to the health facility may have motivated them take their medications more seriously considering the effect this had on their finances compared to those who paid little or nothing to the health facility.

Limitations

Certain limitations were observed in this study. The cross-sectional nature of the study did not allow for inferences to be drawn as to causal relationship among variables.

The use of patient's self-report to assess medication adherence was a limitation in this study since patients had to recall their medication adherence in the previous week which methodologically could be associated with recall bias. To help reduce recall bias, the period of recall was limited to 7 days prior to the study. Patients also tended to either over- or underestimate their adherence to HAART. This drawback was further worsened by the inability to corroborate patient self-reported adherence with viral loads and CD4 responses owing to financial and logistic constraint of frequent laboratory monitoring.

Conclusion

The medication adherence rate recorded in this study was low among HIV positive women in UCTH Calabar, Nigeria. This has serious implications for treatment failure and subsequently drug resistance. The predictors of adherence in the present study included: having fewer children, non-payment of ART services, reduced pill load, perceived health status as improved and increased transport cost to health facility. The authors therefore recommend the provision of free services at every ART clinic which should include treatment of opportunistic infections and required important investigations. This will aid in tackling the challenges of poor adherence. The use of treatment or adherence reminders or supporters may be very

useful especially for women who are saddled with the additional responsibilities of home and family and tend to forget their medications in the process. In addition, family planning must be stressed and given out to HIV positive women whose families have to be planned to avoid having too many children. Lastly, ARV manufacturing pharmaceutical companies should ensure that all recommended ARVs consist of a total of two pills or less daily.

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