International Journal of Public Health, Pharmacy and Pharmacology
Vol. 4, No.4, pp.1-13 November 2019
Published by **ECRTD-UK**
Print ISSN: (Print) ISSN 2516-0400
Online ISSN: (Online) ISSN 2516-0419

ADHERENCE TO CURRENT ANTIRETROVIRAL THERAPY (ART) AMONG PEOPLE LIVING WITH HIV/AIDS IN PORT-HARCOURT CITY LOCAL GOVERNMENT AREA OF RIVERS STATE

Adorle Friday Koate
Koate' s compound, off Mgbaraja, by NTA road, Port Harcourt, Rivers state, Nigeria

ABSTRACT: *Introduction: The Human Immunodeficiency Virus (HIV) pandemic continues to be one of the major public health crises in Nigeria and the world, with approximately 17 million people globally living with the virus. To achieve the desired outcome of epidemiological control of HIV/AIDS, strict adherence to antiretroviral therapy is vital. However, many factors have been identified for non-adherence. This research work was designed to determine the extent of adherence to antiretroviral therapy, factors responsible for the non-adherence and the measures used to ensure adherence among people living with HIV/AIDS. Methodology: A cross sectional design was adopted, with a sample size of 417 ARV sero-positive that access ART services at Braithwaite Memorial Specialist Hospital in Port Harcourt local government area Rivers State. Five research questions and three null hypotheses guided the study, with respondents' medication adherence adapted from the Morrisky Medication Adherence scale, and the responses classified into good, fair, and poor medication adherence respectively. Data was collected using an interviewer-administered structured questionnaire (IAQ) and were analysed using SPSS version 21.0. Results: Results revealed that 70.7% of the study population/ respondents were female between the age ranges 20-39 years and 50.7% were married. The extent of adherence to ART amongst the study respondents were 86.0% and out of the eleven (11) variables studied nine (9) were found to be statistically significant associated with respondents' extent of medication adherence. This includes sex (P-value 0.000;95% CI0.00,0.001), age (P-value 0.000;95% CI0.00,0.001), marital status(P-value 0.000;95% CI0.00,0.001), occupation(P-value 0.000;95% CI0.00,0.001), residential area(P-value 0.000;95% CI0.00,0.001), duration of illness(P-value 0.000;95% CI0.00,0.001), duration on ARVs(P-value 0.000;95% CI0.00,0.001), partner's status(P-value 0.000;95% CI0.00,0.001), partner/family awareness of respondent status(P-value 0.000;95% CI0.36,0.45), and long waiting time(P-value 0.000;95% CI0.00,0.001), respectively. Also, respondent ARV regimens of respondents were found to be statistically associated with adherence respectively (p-value 0.000; 95% CI0.00, 0.001). 92.0% of the study respondent ensured adherence to ART using self-reminder, while there was high adherence rate.Summary/conclusion: There is high adherence to ART medication among PLWHIV/AIDS, especially among the married, of reproductive age group and literates. However, counsellors need to lay emphasis on the need for the disclosure of serostatus among partners and friends/family awareness about HIV status, since half of the respondents.*

KEYWORDS: Adherence, Antiretroviral therapy (ART), PLWHIV/AIDS, gender and education.

International Journal of Public Health, Pharmacy and Pharmacology
Vol. 4, No.4, pp.1-13 November 2019
Published by **ECRTD-UK**
Print ISSN: (Print) ISSN 2516-0400
Online ISSN: (Online) ISSN 2516-0419

INTRODUCTION

The human immune deficiency Virus (HIV) pandemic continues to spread in the population, making the disease one of the most important public health crisis in the globally. According to the UNAIDS (2015), approximately 36.7 million people were living HIV globally, with only about 17 million of this population being able to access antiretroviral therapy, while there is approximately 2.1 million incidence and 1.1 million deaths attributed to HIV/AIDS related illnesses. About 67% of the total global epidemic of HIV/AIDS is in sub-Saharan Africa, with Nigeria having the second highest burden of infection behind South Africa and India (UNAIDS, 2016). The adherence to medicines for chronic health conditions in general is poorly documented in developing countries, and the few available is discouraging. Reports from a study in Malaysia on adherence in long-term medicines revealed only 44% adherence among patients, with challenges of overdosing, under-dosing and wastages were prevalent (Aziz & Ibrahim, 1999).

In sub-Sahara Africa, adherence rate varies depending on time location of studies. One of the studies conducted by Wesier *et al*. (2003) in Botswana found self-reported and provider assessment adherence rates of 54% and 56% respectively. Other studies reported 66% in Uganda (Byakika-Tusime *et al*., 2005), 22% in Cote D'Ivoire (Eholie *et al*., 2007) and 71% in South Africa (Chebikuli *et al*., 2004).

In Nigeria, adherence rates had been reported by studies to range from 44% (Mohammed, 2004) to more than 95% (Ihyasu *et al*., 2005). For instance, adherence levels of 49.2% was reported in Port Harcourt (Nwauche *et al*., 2006), 58% in Benin (Erah & Arute, 2008), 62.9% in Ibadan (Olowokere *et al*., 2008), 44% in Ille-Ijesha (Afolabi *et al*., 2009), 62.8% in Keffi (Abdullahi & Bako, 2013), 80% in Kano (Mukata-Yila *et al*., 2006) and 75.3% in Enugu (Uzochukwu *et al*., 2009). Hence, evidence-based data from developing countries regarding antiretroviral therapy adherence rates and effectiveness of support intervention are still limited, most especially, in the region of Nigeria where this study was conducted. This clearly shows the poor level of adherence in the country.

Good adherence is key to antiretroviral therapy (ART) management. However, there is no standard definition of adherence. In this context, adherence is defined as taking one's drugs/medication/medicine as prescribed and agreed between the patient and provider. Poor adherence includes missing doses completely as well as taking drugs inappropriately (taking doses at the wrong times or not complying to dietary requirements associated with a drug (Waters & Nelson, 2007). However, there is no good standard to measure adherence. Commonly used methods include patient self-report, pills count, pharmacy refill records, drug levels monitoring, electronic drug monitoring and physician assessment, each of which has advantages and disadvantages (Gill *et al*., 2005). The most commonly used methods in resource limited setting is self-report or pharmacy refill records (Chesney, 2006). However, adherence rate to antiretroviral (ARV) medicines for patients with Acquired Immune Deficiency Syndrome (AIDS) appear to be

a different story, particularly in Africa, with studies reporting adherence levels as high as 85-97% (Byakika *et al*., 2005; Nachega *et al*., 2004; Orrell *et al*., 2003). This could be due to the immune status of the patients. Studies have established a clear association between viral suppression and the percentages of antiretroviral doses taken as prescribed. Specifically, greater adherence is associated with better viral suppression; emergence of ART drug resistance, leading to disease progression and death (Bangsberg *et al*., 2006; Nachega *et al*., 2006; Bangsberg *et al*., 2001).
Since the shift to the use of highly active antiretroviral therapy (HAART) for treating HIV, the complex drug regimen has led to concerns of adherence and more complications. These present significant challenges to both patients and health care providers.

There are several key issues in the study of adherence to antiretroviral therapy including accurate measurement of adherence, assessment of the impact of adherence on viral load and clinical outcome, determination of the factors that affects adherence and the development of interventions. Addressing these issues may provide valuable information about which patients are most at risk for non-adherence and how adherence might be improved. Among other factors, the critical factors that influence adherence are patient factors, medication regimen, patient-health care provider relationship and system of care (Margaret & Chesney, 2000).

When patients are initiated on ART, a lot depends on their preparation and education regarding side effects. Their understanding of the occurrence and nature of side effects could be limited and may get influenced by contextual factors. Social and psychological factors play significant roles on the extent and how effective a patient adheres to medication. A medical records study of 345 randomly selected antiretroviral-naïve patients by O'Brein *et al*. (2003) showed that 61% patients changed or discontinued their initial ART regimen, with 24% doing so because of an adverse event. Other factors, especially, in the country of this study include, switch to other systems of medicine, such as traditional/complementary medicine (Amon, 2008; Lora *et al*., 2008; Dahad & Charalambus, 2008; Ahmad 2007; Chorkrapani *et al*., 2007). For effective use of ARVs to be optimal, adherence to antiretroviral treatment (ART) is key in achieving virological suppression and to attain the vision 90:90:90; for 90% of the HIV positive patients to be on drugs, 90% retention in care, and 90% viral suppression (WHO, 2014). However, with all the streamline regimen of ARTs available, and other benefits (such as viral suppression, decreased risk of opportunistic infections) less than 70% of the patients adhere to their medication effectively as advocated by global best practices. Also, considering the multiple negative effects of non-adherence to medications; poor CD4 cell count, virological and immunological failure, increased frequency of hospitalization and duration of hospital stay, health maintenance and increased cost of treating complications of opportunistic infections (Chesney, 2013), it becomes pertinent to ascertain the extent of adherence to current antiretroviral therapy, its predictors and factors that influence adherence among people living with HIV/AIDS (PLWHIV/AIDS) in Port Harcourt. Thus, the study was initiated.

International Journal of Public Health, Pharmacy and Pharmacology
Vol. 4, No.4, pp.1-13 November 2019
Published by ECRTD-UK
Print ISSN: (Print) ISSN 2516-0400
Online ISSN: (Online) ISSN 2516-0419

METHODOLOGY

The explorative nature and the views of Nworgu (2006) on research survey and Agbakwuru & Okafor (2009) on cross-sectional design of research necessitated the adoption of cross-sectional survey design for this study, which was conducted at the Braithwaite Memorial Specialist Hospital (BMSH) in Port Harcourt city local government area of Rivers state, Nigeria. The target population (Nworgu, 2006) comprised about 5,000 PLWHIV/AIDS, however, those that are accessible based on adherence prevalence of 44.0% (Afolabi *et al*., 2009) were 417, using Fischer's sample size calculating formula as prescribed by Araoye (2003). Purposive stratified cluster sampling technique was employed, owing to the inclusion criteria of the respondents being on drug for at least six months. **A** structured, interviewer-guided questionnaire comprising of four sections (socio-demographic, disease variables, treatment variables and adherence predictors, and medication adherence) adapted from Morisky Medication Adherence Scale (MMAS) was used to obtain information from the respondents, with responses to medication adherence classified into good, fair and poor, while responses of "yes" to five, three and two questions on medical adherence classified poor, fair and good respectively.

The instrument for the study was developed by the researcher, but validated by a health facility staff of the BMSH and two other lecturers in the Department of Public Health, Imo State University, Owerri, while the obtained data were analysed using SPSS version 21 and the results presented in tables and graphs. The reliability for the instrument was the test-retest method, in which ten (10) copies of the questionnaires were administered to 10 PLWHIV/AIDS in the BMSH who have been on ARV therapy for not less than six (6) months, and there were no limitations.

RESULTS

Table 1: Socio-demographic profile of the respondents

Variable	frequency	%
Sex		
Male	122	29.3
Female	295	70.7
Age (years)		
<20	0	0
20-29	53	12.7
30-39	169	40.5
40-49	126	30.2
≥50	69	16.5
Marital status		
Married	246	59.0
Single	97	23.3
Widowed	69	16.5
Divorced	5	1.2
Occupation		
Public servant	109	26.1
Student	15	3.6

Self-employed	249	59.7
Unemployed	44	10.6
Highest level of education		
No formal	19	4.6
Primary	92	22.1
Secondary	225	54.0
Tertiary	81	19.4
Residential area		
Urban	323	77.5
Rural	30	22.5
Social status		
Class 3	29	7
Class 2	30	7.2
Class 1	313	75.1

Table 2: Descriptive statistics of monthly income of respondents

Mean (₦)	51422.04
Standard déviation	74530.93
Minimum (₦)	13000.00
Maximum (₦)	360000.00

Table 3: Relationship between some exploratory variables and respondents' medication adherence

Variable	Medication Adherence (%)			X^2	P-Value	95% CI
	Good	Fair	Poor			
Sex						
Male	102 (83.6)	20 (16.4)	0 (0.0)	16.275	0.000*	0.00,0.01
Females	256 (86.8)	20 (6.8)	19 (6.4)			
Age (years)						
<20	0 (0.0)	0 (0.0)	0 (0.0)	21.508	0.000*	0.00,0.01
20-29	48 (90.6)	5 (9.4)	0 (0.0)			
30-39	135 (79.9)	20 (11.8)	14 (8.3)			
40-49	106 (84.1)	15 (11.9)	5 (4.0)			
≥50	69 (100.0)	0 (0.0)	0 (0.0)			
Marital Status						
Married	207 (84.1)	30 (12.2)	9 (3.7)	22.022	0.001*	0.00,0.01
Single	77 (79.4)	10 (10.3)	10 (10.3)			
Widowed	69 (100.0)	0 (0.0)	0 (0.0)			
Divorced	5 (100.0)	0 (0.0)	0 (0.0)			
Occupation						
Public Servant	94 (86.2)	15 (13.8)	0 (0.0)	26.188	0.000*	0.00,0.01
Student	10 (66.7)	5 (33.3)	0 (0.0)			
Self-Employed	220 (88.4)	15 (6.0)	14 (5.6)			
Unemployed	34 (77.3)	5 (11.4)	5 (11.4)			
Education						
None	19 (100.0)	0 (0.0)	0 (0.0)	5.694	0.458	0.42,0.52
Primary	77 (83.7)	10 (10.9)	5 (5.4)			
Secondary	191 (84.9)	25 (11.1)	9 (4.0)			
Tertiary	71 (87.7)	5 (6.2)	5 (6.2)			
Residential area						
Urban	264 (81.7)	40 (12.4)	19 (5.9)	20.000	0.000*	0.00,0.01
Rural						

Duration of illness (years)						
<1	49 (71.0)	20 (29.0)	0 (0.0)	51.373	0.000*	0.00,0.01
1-3	123 (86.6)	10 (7.0)	9 (6.3)			
4-6	99 (90.8)	5 (4.6)	5 (4.6)			
7-10	58 (92.1)	5 (7.9)	0 (0.0)			
>10	29 (85.3)	0 (0.0)	5 (14.7)			
Duration on ARV therapy (years)						
<1	54 (73.0)	20 (27.00	0 (0.0)	57.327	0.000*	0.00,0.01
1-3	147 (88.6)	10 (6.0)	9 (5.4)			
4-6	74 (88.1)	5 (6.0)	5 (6.0)			
7-10	-68 (93.2)	5 (6.8)	0 (0.0)			
>10	15 (75.0)	0 (0.0)	5 (25.0)			
Partner's status						
Seropositive	55 (91.7)	5 (8.3)	0 (0.0)	54.566	0.000*	0.00,0.01
Seronegative	119 (80.4)	15 (10.1)	14 (9.5)			
Unknown	54 (73.0)	20 (27.0)	0 (0.0)			
Partner/family's awareness						
Yes	294 (87.0)	30 (8.9)	14 (4.1)	13.269	0.010*	0.36,0.45
No	64 (81.0)	10 (12.7)	5 (6.3)			
Does not matter	53 (84.1)	5 (7.9)	5 (7.9)			
Easy location of facility						
Yes	308 (85.1)	35 (9.7)	19 (5.2)	3.092	0.213	0.17,0.25
No	50 (90.9)	5 (9.1)	0 (0.0)			
Long waiting time						
Yes	94 (91.3)	0 (0.0)	9 (8.7)	18.831	0.000*	0.00,0.01
No	264 (84.1)	40 (12.7)	10 (3.2)			

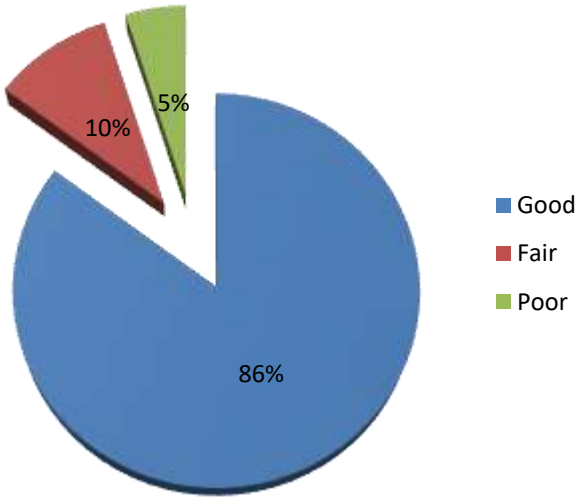

Fig. 1 Adherence level of respondents.

International Journal of Public Health, Pharmacy and Pharmacology
Vol. 4, No.4, pp.1-13 November 2019
Published by ECRTD-UK
Print ISSN: (Print) ISSN 2516-0400
Online ISSN: (Online) ISSN 2516-0419

Table 4: Prevalence of some side effects of ARV therapy in the study population

Symptoms	frequency	(%)
Dizziness	165	39.6
Headache	15	3.6
Altered sleep pattern	20	4.8
Rash/itching	15	3.6
Tingling sensation	9	2.2
Nightmare	15	3.6

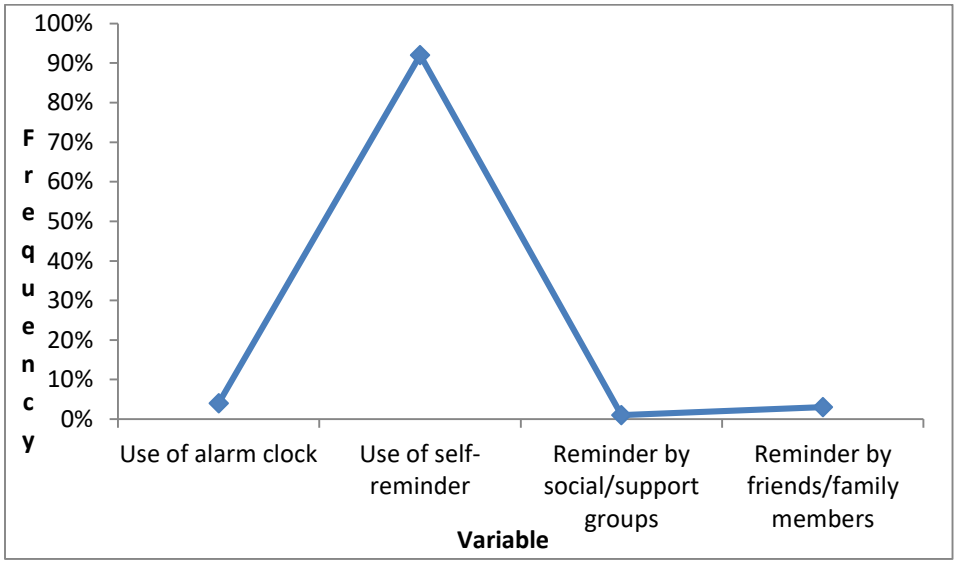

Fig. 3: Methods used by respondents for ensuring medication adherence.

Table 5. Relationship between ARV regimen the respondents are currently on and medication adherence.

Current ARV regimen	Medication adherence					
	Good	Fair	Poor	X^2	P-value	95% CI
AZT/3TC/NVP	200 (89.3)	10 (4.5)	14 (6.2)	17.819	0.000*	0.00,0.01
TDF/3TC/EFV	153 (81.4)	30 (16.0)	5 (2.7)			
ABC/3TC/EFV	5 (100.0)	0 (0.0)	0 (0.0)			
Alluvia/AZT/3TC	0 (0.0)	0 (0.0)	0 (0.0)			
Alluvia/AZT/3TC	0 (0.0)	0 (0.0)	0 (0.0)			
Atazanavir/TDF/3TC	0 (0.0)	0 (0.0)	0 (0.0)			
Others	0 (0.0)	0 (0.0)	0 (0.0)			

International Journal of Public Health, Pharmacy and Pharmacology
Vol. 4, No.4, pp.1-13 November 2019
Published by **ECRTD-UK**
Print ISSN: (Print) ISSN 2516-0400
Online ISSN: (Online) ISSN 2516-0419

DISCUSSION OF RESULTS

The demographic parameters showed that 295(70.7%) of the respondents were females, with the most affected age range being 30-39 years(40.5%) and 40-49 years(30.2%). Hence, the burden of HIV/AIDS lies between 30-49 years. 59.0% respondents were married, with 23.3% were single, while 59.7% were self-employed and 10.6% unemployed. 54.0% and 22.1% attained secondary and primary school education respectively while, 75.1% respondents were in social status 1. This is similar to the findings by Suleiman & Momo (2016) which reported 57.9% females and 26-35years (52.2%) and 36-45 years (25.1%) in their study.

The study observed 54.2% married and 24.5% single respondents, with 35.1% having secondary school education, while 55.9% were self-employed. This conforms with the findings of Mitiku *et al*. (2013) which revealed majority female respondents, with most being 20-39 years (42.7%), were married (87.4%) and were literates. This, however, is in contrast to the findings of Cauldbeck *et al*. (2009) and Amberbir *et al*. (2008), with Erah & Arute (2008) adding that better educated individuals generally have access to information and are more likely to make better informed decision.

This study also revealed 86.0% adherence rate of respondents that is similar to the findings by Mitiku *et al*. (2013) that reported adherence rate of 87.0%, Jean-Baptiste (2008) that reported 98.0%, Sulieman &Momo (2016) which reported 73.4% on factors associated with adherence to antiretroviral therapy in PLWHIV/AIDS in Bayelsa state, Nigeria and 80.0% adherence rate reported in Kano, Nigeria by Yola *et al*. (2006). However, studies by Nwauche *et al*. (2004); Erah & Ature (2013) and Uzochukwu *et al*. (2009) across different regions of Nigeria reported low adherence rates ranging from 44.0-65.5%.

These results show that there is no significant difference in the extent of adherence to ARVs among PLWHIV/AIDS in Port Harcourt City Local Government Area compared to other studies.
The study showed that occupation, education, proximity to the facility, duration of illness in years, duration on ART, partner's status, friends/family awareness and time spent in the facility were identified as factors that could statistically influence respondent's adherence to ARV therapy, with their variables showing statistical significance. These findings are similar to those reported by Suleiman & Momo (2016); Jean-Baptiste (2008); Igwebe *et al*. (2010); Cauldbeck *et al*. (2009) and Amberbir *et al*. (2008).

Many respondents in the study (56.8%) reported at least one side effect following use of one drug, with the most common side effect reported being dizziness (37.6%) and altered sleep (4.8%), while the least was tingling sensation (2.2%). This finding is contrary to that from a similar study by Bello (2010) which reported general body weakness (16.4%), severe headache (14.6%), sleep disturbance (12.7%), anaemia (3.3%) and peripheral neuropathy, such as tingling sensation (1.4%). The difference could be due to the sample size of the study respondent, as well as, the proportion of patients on various regimens.

Measures/methods used by respondents to ensure adherence to ARVs drugs in this study was 92.0% self-reminder, 4% alarm and 1% social support. This finding is in tandem with that of Tran *et al*. (2013) and Jean-Baptiste (2008) on determinants of ARV treatment adherence among HIV/AIDS patients, with results showing that significantly greater proportion of patients who took at least 95% of their prescribed ARVs had good social support compared to those who did not (64% versus 48%, p=0.03). However, in this study majority of the respondents use self-reminder, which is traceable to the fact that 81.0% of them have friends/family members who were unaware of their status.

The study also reveals that gender (P-value 0.000; 95% CI 0.00, 0.001) had statistically significant influence on the extent of medication adherence to ARVs among people living with HIV/AIDS. This finding is similar to those reported by Suleiman & Momo (2016) and Tean-Baptiste (2008) in which sex and had p-values of 0.0196 and 0.001 respectively, but contrary to that of Igwebe *et al*. (2010) which reported p-values of 0.03 for parity, 0.05 for zero-concordant relationship and 0.003 for non-disclosure of HIV sero-positive status respectively, in the course of a 2-year regimen duration.

The study reveals that age (P-value 0.000; 95% CI 0.00, 0.001) have statistically significant influence on the extent of medication adherence to ARVs among PLWHIV/AIDS. The finding also agrees with the report of Suleiman & Momo (2016) in which age, marital status, occupation and therapy duration had p-values of p=0.0001, p=0.0007, p=0.0470 and p=0.0016 respectively, and that of Jean-Baptiste (2008) which reported that sex, age, duration of ARV therapy and receiving therapy in non-urban setting had p-values of 0.001, 0.02, 0.002 and 0.001 respectively.
This study observed that marital status (p-value 0.000; 95% CI 0.00, 0.001) have statistically significant influence on the extent of medication adherence to ARVs among PLWHIV/AIDS. The finding agrees with the report by Suleiman & Momo (2016) in which the p-values for sex, age, marital status, occupation and therapy duration were 0.0196, 0.0001, 0.0007, 0.0470 and 0.0016 respectively, and that of Okorokwo *et al*. (2013) which showed that marital status influenced the extent of ARV adherence rate.

Summary

Adherence to antiretroviral drugs among PLWHID/AIDS cannot be over emphasized, owing to its importance and benefits to the patients, health care system and society at large. In the study, the PLWHIV/AIDS in Port Harcourt city local government area showed 86.0% adherence rate to their ARV medication, with majority of the respondents' (70.7%) being females between 20-39 years of age and 50.7% married , while 23.3 % were unmarried. The influence of gender (86.8%, female and 83.6%, male), age (40.5%, 30-39 years and 16.5%, ≥50 years), and marital status (59.0%, married and 23.0%, singles) and was showed to statistically influence their extent of adherence to ARVs. Other factors revealed to influence extent of adherence include monthly income, extent on ARVs, patient's regimen, distance from to facility among others were showed to influence extent of adherence among people living HIV/AIDS on their ARVs medications. Educational level was not found to influence the extent of adherence to ARVs which is in line with

other studies. The five (5) null hypotheses postulated were revealed that there is significant difference in the extent of adherence to ARVs among PLWHIV in Port Harcourt city local government area. Also age, gender (male and female) and marital status (married and unmarried) was showed to have significant difference on the extent of adherence to ARVs among PLWHIV in Port Harcourt city local government area, Rivers state, Nigeria.

CONCLUSION

Adherence to antiretroviral therapy is a key issue in management of HIV/AIDS, just like other chronic health conditions (diabetes mellitus, hypertension amongst others). But, over the years strict adherence to antiretroviral therapy has posed a serious public health challenge to health care providers and the patients alike, and measurement of the extent of adherence to antiretroviral therapy has been strenuous due to lack of universally acceptable definition of adherence and strict method and means of measuring adherence of patient to ARVs. Adherence rate over the years has generally been low in sub-Sahara Africa and Nigeria. However, recent studies, from different regions, have shown an increase in adherence rate to antiretroviral drugs, including south-south Nigeria. Several factors have been associated with the low rate of adherence to antiretroviral drugs (gender, age difference, marital status, social status, duration on ARVs and illness just to mention a few) and the attitude of health workers towards the patients. Therefore, adherence rate among study respondents in Port Harcourt local government area is good but there is need for respondents to disclose their sero-status to their partners, since majority of the respondent are married, and strategies should be in place to encourage voluntary testing, counselling and disclosure of status, especially, in communities of high utilization to ART services.

This calls for urgent need to intensify effort to renew strategies that will ensure better adherence, in order to improve the quality of life and care of the patients. Also, deliberate steps must be taken to ensure that sero-status barrier is broken by intensifying couple testing and counselling, especially, at antenatal clinics. Hence there is need for prompt intervention from all stakeholders to ensure the desired success is achieved.

Recommendations

1. Formation of social/peer support groups such as community-based organization to encourage and ensure adherence among PLWHIV in the facility with the support of donor agencies like fhi360.
2. Encourage couple testing and counselling especially during ante-natal care and commencement of ART so as to break the barrier of partner's non-disclosure of serostatus.
3. The health care provider should always mention the possible side effects of the ARVs so as to avoid/prevent stoppage or non-adherence to their ARVs regimen due side effects.
4. Bring treatment centres close to the patients.
5. Health facilities should institutionalise a drug and therapeutic community to review patients' performance as it relates to their care and management.

Suggestion for Further Studies

1. A broad study involving more facilities in different local government areas with large sample size should be conducted on factors that influence adherence and measures of improving adherence among PLWHIV/AIDS to ARVs.
2. A study on awareness, knowledge and attitude of PLWHIV/AIDS towards adherence to antiretroviral drugs.

REFERENCES

Ahmad, K. (2007). Antiretroviral therapy abandoned for herbal remedies. *Lancet Infect Dis.* 7:313.

Aziz, A. and Ibrahim, M. (1999). Medication noncompliance: A thriving problem. *Medical Journal of Malaysia.* 54 (2) .67-70

Amberbir, A., Woldemichael, S., Getachew, B. & Deribe, K. (2008), "Predictors of adherence to antiretroviral therapy Among HIV-infected persons: a prospective study in South-west Ethiopia," *BMC Public Health*. 8;265.

Igwegbe, A., Ugboaja, J. & Nwajiaku, L. (2010).Prevalence and determinants of non-adherence to antiretroviral therapy among HIV-positive pregnant women in Nnewi, Nigeria. *International Journal of Medical Sciences*. 2(8);238-245.

Afolabi, M., Ijadunola, K., Fatusi, A. & Olasode, O. (2009). Determinants of adherence to antiretroviral drugs in the Ife-Ijesha zone of Osun State, Nigeria. *Afri J Prim.* Healthcare Fam Med. 1(1):1-6

Bello, S. (2011).HIV/AIDS patient's adherence to antiretroviral therapy in Sobi specialist hospital,Ilorin,Nigeria.*Global journal of medical research*; 11(2), 1.0

Bangsberg, D., Acoata, E. & Gupta, R. (2006). Adherence-resistance relationships for protease and nonnucleoside reverse transcriptase inhibitors explained by virologic fitness. *AIDS.* 20:223–231.

Bangsberg, D., Perry, S., Charlebois, E., Clark, R., Roberston, M., Zolopa, A., & Moss, A. (2001). Non-adherence to highly active antiretroviral therapy predicts progression to AIDS. *AIDS* ; 15:1181-3.

Byakika-Tusiime, J., Oyugi, J., Tumwikirize, W., Katabira, E., Mugyenyi, P., & Bangsberg, D. (2005). Adherence to HIV antiretroviral therapy in HIV+Ugandan patients purchasing therapy. *Int J STD AIDS*.;16(1):38–41.

Eholié, S., Tanon, A., Polneau, S., Ouiminga, M., Djadji, A., Kangah-Koffi, C., Diakité, N., Anglaret, X., Kakou, A. & Bissagnené, E.(2007). Field adherence to highly active antiretroviral therapy in HIV-infected adults in Abidjan, Côte d'Ivoire. *J Acquir Immune* Defic Syndr; 45(3):355–358

Chesney, M., Ickovics, J., Chambers, D., Gifford, A., Neidig, J. & Zwickl, B. (2000). Self-reported adherence to antiretroviral medications among participants in HIV clinical trials: the AACTG adherence instruments. Patient Care Committee & Adherence Working Group of the Outcomes Committee of the Adult AIDS Clinical Trials Group (AACTG). *AIDS Care*.; 12(3):255-66.

Chesney, M. A., Morin, M., & Sherr, L. (2000). Adherence to HIV combination therapy. *Social Science and Medicine*. *50;*1599–1605.

Cauldbeck, M., O'Connor, C. & O'Connor, M. (2009). "Adherence to anti-retroviral therapy among HIV patients in Bangalore, India," *AIDS Research and Therapy*.; 6, 7

Chakrapani, V., Shanmugam, M., Michael, S., Dubrow, R. (2009). Barriers to free antiretroviral treatment access for female sex workers in Chennai, India. Indian Network for People living with HIV and AIDS (INP+), India. AIDS Patient Care *STDs*. 23:973–80

Chabikuli, N., Datonye, D., Nachega, J., & Ansong, D. (2004). Adherence to antiretroviral Therapy, Virologic Failure and Workload at the Rustemburg Provincial Hospital. *S Afr Fam Pract.* 52(4):350–355

Erah, P. & Arute, J. (2008). Adherence of HIV/AIDS patients to antiretroviral therapy in a tertiary health facility in Benin city. .*African journal of pharmacy and pharmacology*. (2)145-152.

Jean-Baptiste, R. (2008). Factors Associated with Adherence to Antiretroviral Therapy Rwanda: A Multi-site Study. Operations Research Results. Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project. Bethesda, MD: *University Research Co., LLC.*

Iliyasu, Z., Kabir, M., Abubakar, I.S., Babashani. M., & Zubair, Z.A.(2005). Compliance to antiretroviral therapy among AIDS patients in Aminu Kano Teaching Hospital, Kano, Nigeria. *Niger J Med*;14(3):290-4.

Margaret, A. (2002). Factors affecting adherence to antiretroviral therapy. *Clinical infections disesase.* 30(2).14

Mehta, S., Moore, R. D., & Graham, N. M. H. (1997). Potential factors affecting adherence with HIV therapy. *AIDS*, *11*, 1665–1670.

Mukhtar-Yola, M., Adeleke, S., Gwarzo, D. & Ladan, Z. (2006). Preliminary investigation of adherence to antiretroviral therapy among children in Aminu Kano Teaching Hospital, Nigeria. *Afr J AIDS Res.* 5(2):141–144.

Mituki, H., Abdosh, T., & Teklemanan, Z. (2013). Factors affecting adherence to antiretroviral treatment in Harari National Regional State, Easter Ethiopia. *IRSN AIDS'*. 960954.

Nachega, J., Stein, D., Lehman, D, Hlatshwayo, D., Mothopeng, R. & Chaisson, R. (2004). Adherence to antiretroviral therapy in HIV-infected adults in Soweto, South Africa. *AIDS Res Hum Retroviruses*. 20(10):1053-6.

Nachega, J., Hislop, M. & Dowdy, D. (2006). Adherence to highly active antiretroviral therapy assessed by pharmacy claims predicts survival in HIV-infected South African Adults. *J Acqui Immune Defic Syndr*. 43:78–84.

Nwauche, C., Erhabor, O., Ejele, O. & Akani, C. (2006). Adherence to antiretroviral therapy among HIV-infected subjects in a resource limited setting in Niger-Delta of Nigeria. *Afr J Health Sci*. 13(3-4):13–17.

O'Brien, M., Clark, R., Besch, C., Myers, L. & Kissinger, P.(2003). Patterns and correlates of discontinuation of the initial HAART regimen in an urban outpatient cohort. *J Acquir Immune Defic Syndr*. 34:407–14.

Okoronkwo, J., Okeke, U., Chinweuba, A. & Iheancho, P. (2013) Non-adherence factors and sociodemographic characteristics of HIV infected Adults receiving antiretroviral therapy in Nnamdi Azikiwe Teaching Hospital Nnewi, Nigeria. *ISRN AIDS; VOL (2013), P8*

Erah, P. & Arute, O. (2008).“Adherence of HIV/AIDS patients to antiretroviral therapy in a tertiary health facility in Benin City.” *African Journal of Pharmacy and Pharmacology.* 2(7):145–152,.

Paterson, D. L., Swindells, S., Mohr, J., Brester, M., Vergis, E. N., Squier, C., et al.
(2000). Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. *Annals of Internal Medicine, 133,* 21–30.

United Nations on AIDS (2008). Report on the global epidermic ,Geneva :UNAIDS; (2008)
Accessed Nov. 20

Uzochukwu, B., Onwujekwe, O., Onoka, A., Okoli, C., Uguru, N. & Chukwuogo, O. (2012). Determinants of non-adherence to subsidized anti-retroviral treatment in southeast Nigeria. Health Policy Plan.

World Health Organization (2003).Adherence to Long-term Therapies, Evidence for Action. Geneva:

Weiser, S., Wolfe, W., & Bangsberg, D. (2003). Barriers to antiretroviral Adherence to patients living with HIV infection and AIDS in Botswana. *J Acquired Immune Defic Syndr*. 34(3):281–288.