

# DETERMINANTS OF MEDICATION ADHERENCE AMONG PATIENTS ON CONCOMITANT TUBERCULOSIS AND ANTIRETROVIRAL THERAPY IN KOGI STATE NIGERIA

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Received: 02.10.19, Revised: 02.11.19, Accepted: 02.12.19

## ABSTRACT

Non-adherence to antiretroviral (ARV) medications as well as drugs used to treat tuberculosis (TB) can lead to manifestations of drug-resistant strains of mycobacterium tuberculosis. This study aimed at assessing the level of medication adherence and its determinants among patients living with HIV/AIDS and TB co-morbidity. A well structured questionnaire for the study of ART and anti TB medication adherence and its determinants was designed and the validity of the questionnaires was assessed through in-depth discussion with experienced consultants working in the ARD/TB clinic of the Federal Medical Center, Lokoja. The questionnaire was pre tested on eight patients on TB and ART concomitant treatment attending Kogi State Specialist Hospital, Lokoja and necessary corrections were made accordingly. The questionnaire used was divided into four parts: The first part was used to record the overall patient's socio- demographic characteristics and clinical information. The second part was the Medication adherence tool containing questions like frequency of times the patient missed a dose per month, reason of missing doses, how to compensate for the missed doses, what they did when their medications finished before refilling. The third part was the patient and health provider (physician, pharmacist, nurse) relationship questionnaire. The final part was used to assess health literacy of the patients which included questions such as whether the patient know missing doses of ARV and anti-TB will result in treatment failure or development of drug resistant, possible ways of transmission of HIV/TB and measure taken to prevent possible transmission of TB to the family members. The questionnaires were checked by the research pharmacists at the end of each day during the survey, for omission of incomplete answers and for coding the responses. Primary outcome measure was medication adherence, while secondary outcome measures were health literacy of patients and patient relation with their healthcare providers. Data was extracted from completed questionnaires, coded and entered into the Microsoft excel sheet for statistical analysis using SPSS 16.0. A total of 450 patients that participated in the study were on antiretroviral and only 60 (13.3%) of them were co-infected with both HIV and tuberculosis and are on both ARV and TB medications. Majority of the respondents were male (63.3%) and are above 45 years of age. About 23 of the patients were said to be single, 20 patients were married, and 8 of them were divorced/separated while 17 of them were widowed. About 81.7% of the respondents have one form of education or the other. Less than half of the respondents have a source of income. 23 persons (38.3%) reported never to have missed their ARV's while only 18 persons (30%) reported never to have missed their tuberculosis medications. About 8 patients (13.3%) for ARV's and 10 patients (16.7%) for anti-TB reported 'forgetfulness' as the reason for missing their medications. Majority of the patients (31.7% for ARV's and 18.3% for anti-TB) reported that experiencing side effects was the reason for missing their medications. Also most of the patients (11.7% for ARV's and 20.0% for anti TB) said the reason they missed their medications was because they did not have money to transport themselves to the health facility. For the ARV's, only 8 persons (13.3%) said the reason they missed their medications was because they were getting bored of the whole treatment or feeling worse about their condition. Only 5 persons (8.3%) for ARV's and 3 persons (5.0%) said the reason they missed their medications was because they were already feeling better. 90% of the respondents reported good relationship with Physician. Medication adherence is of paramount importance to achieve optimal economic, clinical and humanistic outcome. From the study, majority of the patients (78.3%) have the knowledge about the fact that missing doses of ARV and anti TB results in treatment failure. Forgetfulness, side effect and lack of money for transportation were the major reasons reported by the patients as to why they missed their medications, while gender, age, educational status and employment status do not play a significant role in the adherence of both the ARV's and anti-TB therapy.

**Keyword:** Adherence, antiretrovirals, Anti-TB

## INTRODUCTION

One of the potential risk factors for tuberculosis is the human immune deficiency virus [Corbett et al, et al]. The major cause of morbidity and mortality in human immune virus (HIV) infected individuals is

tuberculosis [Thongcharoen P, et al]. Adherence is taking medications exactly as prescribed by the physician or pharmacist. Good clinical outcomes, reduction in mortality and morbidity are the core benefits of adherence [Scanlon M, et al]. Adherence

is very important in the treatment of patients infected with HIV and tuberculosis. Non-adherence can lead to the emergence of drug resistant strains leading to increased difficulty in treatment, increased cost of treatment, poor prognosis, decreased quality of life and most often, death. To reinforce adherence to tuberculosis treatment, directly observed therapy is highly recommended [Corbett E, et al]. More than 95% adherence is usually required for antiretroviral therapy in order to achieve both optimal HIV suppression, humanistic and clinical outcomes [Scanlon M, et al]. Antiretroviral drugs have transformed the daily life of HIV-infected individuals. Although HIV-positive individuals are no longer confronted with a rapid and fatal prognosis, they still have to cope with living with a chronic disease [Thongcharoen P, et al]. Diminished outcome for the patient, public health threat to multidrug-resistant HIV and widespread transmission of drug-resistant virus are all consequences of poor adherence [Redal A, et al].

### Objectives

General: The objective of this study was to assess the degree of drug adherence and its determinants in patients living with HIV/AIDS and Tuberculosis comorbidity.

### METHODS

#### Study population

The study population consisted of all patients attending the ARD Clinic and are on concomitant ARVs and Anti-TB medications. The study sample included all those who visited the clinic within the period of study and also gave a written informed consent to participate in the study

#### Study design

A cross sectional study was carried out from June 30 to September 30, 2018 in Federal Medical Center Lokoja which is found in Lokoja Local Government Area of Kogi State, North Central Nigeria. The institution (FMCL) is the largest of the three tertiary health institutions in Kogi State and it is located in the heart of the state capital, Lokoja. The hospital serves as a referral centre for all primary and secondary health facilities in the state, as well as neighbouring states. It is a 350 bedded hospital. The paediatric surgery ward has total of 10 beds while the paediatric medical ward has a total of 15 beds, where surgical patients may be admitted when the paediatric surgical ward is filled up. Paediatric acute appendicitis is done as emergency cases in this health facility. Kogi State is the 24th largest State in Nigeria with a population of 3,314,043 as at 2006 national census and a projected population in 2017 estimated to be 4,252,665. It is among the six North Central States of Nigeria. It has 21 local government areas. Lokoja is located at a geographic coordinates

of latitude 7.80N, 6.740E and 55 meters above sea level. It has a maximum temperature of 39.6o C between the months of October to May with a relative humidity of 60% and annual rainfall of about 1000mm. Lokoja has a total population of 196,643 people as at the last 2006 national census. The main ethnic groups are Igala, Ebira and Yoruba. [Kissinger P, et al]

#### Inclusion criteria

- 1) All patients on concomitant ARVs and Anti-TB medications
- 2) Willingness to participate in the study
- 3) Able to read and write

#### Exclusion criteria

- 1) Those on ARVs alone
- 2) Those on Anti-TB alone
- 3) Psychiatric illness

#### Data collection

A well structured questionnaire was designed to capture the demographic characteristics of the patients. A validated medication adherence questionnaire was used to measure the level of medication adherence of both ART and TB medications. A well structured questionnaire for the study of ART and anti TB medication adherence and its determinants was designed and the validity of the questionnaires was assessed through in-depth discussion with experienced consultants working in the ARD/TB clinic of the Federal Medical Center, Lokoja. The questionnaire was pre tested on eight patients on TB and ART concomitant treatment attending Kogi State Specialist Hospital, Lokoja and necessary correction was made accordingly. The questionnaire used was divided in to four parts: The first part was used to record the overall patients socio-demographic characteristics and clinical information. The second part was the Medication adherence tool containing questions like frequency of times the patient missed a dose per month, reason of missing doses, how to compensate for the missed doses, what to do if you finished medications before refilling. The third part was the patient and health provider (physician, pharmacist, nurse) relationship questionnaire. The final part was used to assess health literacy of the patients which included questions such as whether the patient know missing doses of ARV and anti-TB will result in treatment failure or development of drug resistant, possible ways of transmission of HIV/TB and measure taken to prevent possible transmission of TB to the family members. The questionnaires were checked by the research pharmacists at the end of each day during the survey, for omission of incomplete answers and for coding the responses.

**Table 1. Demographic data of patients with HIV/AIDS and TB comorbidity treated at the Federal Medical Center Lokoja.**

	Frequency	Percent (%)
<b>Gender</b>		
Male	38	63.3
Female	22	36.6
<b>Age group, years</b>		
15-24	9	15.0
25-34	12	20.0
35-44	11	18.3
45-54	22	36.7
Above 54	6	10
<b>Marital status</b>		
Single	23	38.3
Married	12	20
Divorced/separated	8	13.3
Widowed	17	28.3
<b>Educational status</b>		
None	11	18.3
Primary	15	25.0
Secondary	18	30.0
Post secondary	16	26.7
<b>Employment status</b>		
Student or unemployed	25	41.7
Self Employed	12	20.0
Government employed	11	18.3
Retired	12	20.0

**Outcome measured**

Primary outcome measure: Medication adherence

Secondary outcome measures: Health literacy of patients, patient relation with their healthcare providers.

**Data analysis**

Data was extracted from completed questionnaires, coded and entered into the Microsoft excel sheet. The statistical software SPSS v. 16.0 was used to analyze the results obtained. Descriptive statistics such as mean, frequencies and percentages were used to describe and summarize the data. Chi square was used to determine the relationship between demographic variables and medication non-adherence

**Ethical approval**

This study was approved by the research and ethics committee of the Federal Medical Center, Lokoja, Kogi State. Patient informed verbal consent was also obtained before the questionnaires were administered to them.

**RESULTS****Socio-Demographic Characteristics**

There were 450 patients on antiretrovirals and only 60 (13.3%) of them were co-infected with both HIV and tuberculosis and are on both ARV and TB

medications. Majority of the respondents were male (63.3%) and are above 45 years of age. About 23 of the patients were said to be single, 20 patients were married, 8 of them were divorced/separated while 17 of them were widowed. About 81.7% of the respondents have one form of education or the other. Less than half of the respondents have a source of income.

**DISCUSSION**

Medication adherence is of paramount importance to achieve optimal economic, clinical and humanistic outcome. In this study, out of the 450 persons currently on antiretrovirals, only 60(13.3%) are co-infected with HIV and tuberculosis. Only about 38.3% of the population under study have optimal adherence to the antiretrovirals. Other studies report adherence levels from 58.8% to 93.5% [Croteau D, et al]. Gender, age, educational status and employment status does not play a significant role in the adherence of both the ARV's and anti-TB in this study. Employment status was found to be significantly associated to medication adherence. This could possibly be explained by the fact that those who were employed had more income than those who were not. Majority of the patients who reported that lack of money was the reason they missed their medication were unemployed. Forgetfulness, side effect and lack of money for

transportation were the major reasons reported by the patients as to why they missed their medications. Poor provider- patient relationships have been shown to have an impact on adherence. In this study, patient-provider relationship is significantly associated with adherence ( $p=0.000$ ). Creating a conducive atmosphere for interaction may improve patient-provider relationship which will give these patients an atmosphere to explain to their health care providers the reasons why they miss their doses as well as the health care providers educating the patients on self care for their disease states. Less than three quarter of the entire participants reported 100% adherence to their prescribed ART. Medication

adherence in this population is less compared to what has been reported in other studies [Easterbrook P, et al]. Also resource limited settings like the rural areas present unique challenges to ART adherence. Murkherjee et al showed that a lot of structural barriers prevent access to health care and a regular supply of antiretroviral. These include the cost of drugs, medical care and difficulty in attending follow up appointments due to long distances, family responsibilities and prohibitive cost of transportation. This is in agreement with the result of this study as most of the patients reported that cost of transportation were the reason their medications.

**Table 2: Medication Adherence of patients co-infected with HIV/AIDS and Tuberculosis being treated at the Federal Medical Center Lokoja.**

		ARVs	Anti TB	
		Frequency (%)	Frequency (%)	
Frequency of missed doses per month	No	23 (38.3)	16(26.7)	
	Once	16 (26.7)	11(18.3)	
	Twice	9 (15.0)	23(38.3)	
	Three times	11 (18.3)	10(15.5)	
	More than three times	1 (1.7)	0(0)	
Reason for missed doses	Forget	8 (13.3)	10 (16.7)	
	Felling better	5 (8.3)	3 (5)	
	Feeling worse	8 (13.3)	2 (3.3)	
	Getting bored	8 (13.3)	2 (3.3)	
	Failure to disclose	2 (3.3)	5 (8.3)	
	Loss of hope to live	1 (1.7)	8 (13.3)	
	Side effect	19 (31.7)	11 (18.3)	
	Lack of money for transport	7 (11.7)	12 (20.0)	
	Many of the pills were big	2 (3.3)	7 (11.7)	
	Ways to compensate for the missed doses	No measure taken	32 (53.3)	32 (53.3)
		Take immediately when I remember	28 (46.7)	28 (46.7)
	Action taken when drug run out before refill time	Wait until the refill date	18 (30.0)	18 (30.0)
Go for refill to add medications		42 (70.0)	48 (70.0)	

From the study, majority of the patients (78.3%) have the knowledge about the fact that missing doses of ARV and anti TB results in treatment failure. About 32(53.3%) of them acknowledged that they know the possible means of transmission of HIV and TB. About 12 persons (20.0%) believe that sleeping together or

talking near family members can lead to the transmission of these disease. Also majority (65.0%) of the respondents said that the source of knowledge about consequence of missing medications was from the health facility that is the Federal Medical Center.

**Table 3: Health Literacy of patients co-infected with HIV/AIDS and TB and receiving treatment at FMC Lokoja.**

		Frequency (%)
Missing doses of ARV and Anti-TB result in treatment failures	Yes	47 (78.3)
	No	13 (21.7)
Possible means of transmission of HIV and TB	Know	32 (53.3)
	Do not know	28 (46.7)
To prevent transmission of this disease to family members, I avoid sleeping together or talking near them.	Yes	12 (20.0)
	No	48 (80.0)
The source of knowledge about consequence of missing medications	Health facilities	39 (65.0)
	Media	6 (10.0)
	Neighbours and friends	15 (25.0)

**Table 4: Factors associated with Adherence to Arvs and Anti-Tb Medications**

Characteristics		Factors associated with medication adherence				
		ARVs		ANTI-TB		
		Frequency (%)	P value	Frequency (%)	P value	
Educational status	None	11	0.36	18.3	0.31	
	Primary	15		25.0		
	Secondary	18		30.0		
	Post secondary	16		26.7		
Marital status	Married	12(20.0)	0.034	12(20.0)	0.034	
	Unmarried	48(80.)		48(80.0)		
Employment status	Employed	48(80.0)	0.012	48(80.0)	0.012	
	Unemployed	12(20.0)		12(20.0)		
Reason of missed dose	Forget it	8 (13.3)	0.022	10 (16.7)	0.038	
	Feeling better	5 (8.3)				
	Felling worse					
	Getting bored	8(13.3)				
	Side effect					
	Loss of hope to live	8(13.3)				2(3.3)
	Lack of money for transport	2(3.3)				
	Failure to disclose	1(1.7)				5(8.3)
	19(31.7)	8(13.3)				
	7(11.70)	11(18.3)				
		12(20.0)				
Relationship with physician	Good	31(51.7)	0.000	31(51.7)	0.000	
	Very good	21(35.0)		21(35.0)		
	Excellent	8(17.3)		8(17.3)		

**CONCLUSION**

The adherence level obtained from this study is moderately low and not encouraging. Bringing this services closer to the patients by opening more centres where they can collect their medications may help reduce transportation costs to these patients. Also creating a more conducive atmosphere where

these patients can interact freely with their health care providers may help improve their adherence. Also proper education could enhance adherence to ART and ANTI-TB. Health literacy of participants in this study was below average and this could contribute to the reason why they are not in full control of their own health. Education on disease

state, self care and medication side effect will reduce the burden on healthcare providers as patients will be able to manage most symptoms at home and also will happily be in charge of their health.

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