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Level of Adherence To Tuberculosis Therapy In Adult Tuberculosis Patients At Chilenje Clinic In Lusaka

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ABSTRACTSTUDY OBJECTIVE; to determine the level of adherence to TB therapy in TB patients on TB treatment at Chilenje clinic in Lusaka.
METHOD; A cross section study was used. The study site wasChilenje clinic in Lusaka and the target population were all TB patients who were on TB therapy between the period from January 2013 to July 2015.The study sample of 321 TB patient's files was selected using a simple random technique on excel version 13. Data collected from patient's files was entered on the data sheet and SPSS version16 .0 for analysis.
DATA ANALYSIS; A descriptive analysis was carried out according to the characteristics of variables. Since the study was capturing nominal and categorical variables such as treatment defaulters, missed appointments, therapy completion etc. the percentages were obtained and cross tabulations were done to determine the Pearsons value and the graphical presentations such as the pie charts and bar charts were designed in excel version 13.
RESULTS
Results; the study found that 69% of patients completed TB treatment, 15defaulted and 16% died during therapy. The study did not find any significant association between patient's age group, sex and category of treatment with patient adherence to TB treatment. The study however found a significant association between the patient's HIV status and adherence to TB treatment.

KEY WORDS; *TB patients, Treatment adherence, Tuberculosis, Multi drug resistant*

1.0 INTRODUCTION

1.1 BACKGROUND

The emergence of drug resistant Tuberculosis (TB) has compounded the global challenges in the fight against TB (Zumla et al., 2012; Chian et al., 2013; Areias et al., 2014; Liu et al., 2014 and World Health Organization (WHO), 2014). For TB therapy to be successful, patients are required to adhere to TB therapy for not less than six months (Nyinyi et al., 2001). Treatment duration largely depends on the type of TB. The 2013, Zambian Standard Treatment Guidelines (STG) has categorized TB patients into two categories. Category I include all new smear positive, negative and extra-pulmonary TB patients while all smear positive retreatment cases, retreatment after treatment failure or defaulting and smear positive relapse cases are category II patients. Patient adherence to TB therapy is one of the most key factors in the control of TB and several authors have cited non patient adherence to TB therapy to be the major cause of Multi Drug Resistant TB (MDR-TB) (Nyinyi et al., 2001; Mishra et al., 2005; Maruza et al., 2011 and Muture et al., 2011).

Drug resistant TB has further increased the challenges in the management and control of TB (Zignol et al., 2006; Naing et al., 2011; Zumla et al., 2012 and Bethesda, 2013). WHO (2004; 2013; 2014), reported an estimate of 9 million incidence of TB globally in 2013 of which 480 000 cases represented the Multi Drug Resistant (MDR-TB), an estimated death toll due to MDR-TB of 28% and a 48% rise in the MDR-TB cases from 210, 000 in 2004 to 480,000 in 2013. Africa accounts for 29% of the 2013 global incidence with South-Africa recording highest drug resistant case rates in sub-Sahara Africa. Zambia in the year 2000 had an estimated proportion of 8.55 per 100,000 of MDR-TB and 1.85% cases among smear positive patients national wide while the chest disease laboratory in 2003 reported 1.8% MDR-TB for new and 2.3% retreated cases. The University Teaching Hospital (UTH) reported a proportion of 10.9% of MDR-TB among the TB culture positive patients between the year 2003 and 2008 (McNerney, 2008; Mukesela, 2011; STG, 2013).

Several interventions such as the motivation of healthcare staff, health education, peer assistance and the Directly Observed Therapy (DOTS) have been put in place by the WHO, and most countries including the

Zambian Ministry of Health (MOH) have adopted them to improve on patient adherence to TB therapy (WHO 2003; MOH 2006; STG 2013). Patient adherence levels to the TB therapy are expected to be more than 90% for cure to be facilitated (Adane et al., 2013).

However, authors have noted that regardless of interventions such as the DOTS, poor patient adherence to TB therapy is still common and that in terms of treatment observation, the DOTS strategy is still weak (Munroe et al., 2007; JHPIEGO, 2013 and Kahissay 2015).

Therefore, this process oriented study will describe the level of adherence to TB therapy in both category I and II adult patients on TB therapy at Lusaka's ChilenjeClinic. The patient's cards, registers and files will be reviewed to capture such variables as patient's age, sex, HIV status and category of treatment. The findings of this study will provide information that may be helpful to the Ministry of health with regards to TB prevention and control.

RESEARCH METHOD.

This chapter looks at various parameters that were used in order to attain the objectives of this study. Such parameters include; the study design, study site, population, study sample, sampling techniques, study variables and data analysis and ethical issues.

2.1 STUDY DESIGN

A cross section study design was used. Selection of the cross section study design was based on specific objectives of this study which were to determine the prevalence of adherence and compare some of the study variables at the same time.

2.2 STUDY SITE

The study was conducted at Chilenje clinic's TB corner. The clinic is situated in the southeastern part of Lusaka and covers a catchment area of over 77 000 residents. It offers both outpatient and inpatient services with bed capacity of 30. The clinic is now being upgraded into a first level hospital (Mtaja et al., 2014).

2.3 TARGET POPULATION

The target population was all TB patients that were registered and underwent treatment at ChilenjeClinic.

2.4 STUDY POPULATION

All the TB patients who were on treatment, from 1st January 2013- 1ST July 2015.

2.5 SAMPLE SIZE

The sample size, calculated using a 29.8% proportion of non-adherence according to a similar study which was done in Ndola (Kaona et al., 2004), a 5% margin of error and 95% confidence interval was 321.

$$N = \frac{Z2x\ P\ (1-P)}{D2} = \frac{(1.96)2 \times 0.298(1-0.298)}{(0.05)2} = 321$$

2.6 SAMPLING TECHNIQUES

The study population was selected from the target population using a simple random selection on excel sheet.All information for the study was obtained from patients files. All the identity numbers of eligible patients were entered in the first column on the excel spread sheet then a new column, called a random column was created. The function that creates random values was created by typing =RAND ( ) formula in the random column. The random values for all the patient file numbers were created by double clicking on the lower right hand corner of the first random value. In the next step, the entire column was copied and pasted on paste values in order to replace the RAND function values with the actual values generated by the function. Doing so will prevent the creation of a new random value each time the page was refreshed. Finally all the columns were highlighted, clicked on data and was sorted by clicking on sort of the column of the random values and all the rows were sorted in order from the lowest to the highest random value and the first 321 patient files were selected

2.7 INCLUSIONCRITERIA.

The inclusion criteria were all registered TB patients from 16 years of age and above that were on treatment from January 2013 and supposed to finish treatment by June 2015.

2.8 EXCLUSION CRITERIA.

The exclusion criteria were all TB patients less than the age of 16 years and those that were transferred to other health facilities during treatment.

2.9 RESEARCH VARIABLES

The variables that were captured in the study are summarized in table 1. Independent variables that were captured are patient's age, HIV status, gender, category of treatment and treatment duration. The level of adherence and number of missed appointments were the dependent variable.

TABLE 1: **Definition, scale and graphical representation of study variables.**

Variable	**definition**	**Scale**	**Graphical representation**
Age	16-19years 20-40 years Above 40 years	Categorical	Pie chart
Gender	Male or female	Nominal	Pie chart
Category of treatment	New or retreatment	Nominal	Pie chart
HIV status	Negative, positive,unknown	Categorical	Pie chart
Phase of treatment	Intensive phase, continuous phase	Nominal	Pie chart
Level of adherence	Completed treatment, interrupted treatment, defaulted,died	Categorical	Pie chart

2.10 **Data collection**

Data collected from patients files using the data collection sheet (refer to appendix III) were entered in the excel data sheet and the Statistical Package for Social Sciences (SPSS).Data was checked for accuracy before entering in SPSS and after data entry and before analysis was done, a cross check of data in the data sheet and the data base was done.

2.11 **Data analysis**

Collected data as summarized on table 1 were entered on SPSS version 16.0 and Microsoft excel version 7 spread sheets. Both descriptive and cross tabulation analysis were done as shown in table 2

1) For ordinal and nominal variables, the percentages of adherence levels were obtained.
2) The graphical presentations such as the pie charts and histogram were designed in excel 7

TABLE 2: **Graphical representation and statistical tests of study variables**

Variable	definition	Scale	Graphical representation	Statistic test
Age	16-19years 20-40 years Above 40 years	Categorical	Pie chart	Chi square test
Gender	Male or female	Nominal	Pie chart	Chi square
Category of treatment	New or retreatment	Nominal	Pie chart	Chi square
HIV status	Negative, positive unknown	Categorical	Pie chart	Chi square
Phase of treatment	Intensive phase, continuous phase	Nominal	Pie chart	Chi square
Level of adherence	Completed treatment, interrupted treatment, defaulted	Categorical	Pie chart	Chi square

2.13 Ethical considerations

1) Since the research involved human subjects, to ensure adherence to the research ethics, ethical rules such as veracity and fidelity were maintained. The information obtained was not disclosed to any third person and was used for academic purposes only and total confidentiality was maintained. The SPSS datasheets were kept in the computer and only authorized people had access to it and the data collection sheets used were kept under lock and key.
2) An approval from the ethics committee was obtained.
3) Clearance and approval from the faculty of Pharmacy and dietetics at LAMU.
3) A letter of request to carry out a study at Chilenje clinic was written to the District medical office and data collection was only commenced upon receipt of an approval letter from the district medical officer.

RESULTS

Three hundred and twenty one files for TB patients who were on TB therapy between January 2013 and July 2015 were reviewed. As shown in table 3, among the 321, 63.2%(203)were male and 36.8% (118) were female patientfiles. The majority of patients were aged between 20 – 40 years and about 80% were category I patients. The total number of HIV/TB co infectedpatient's was65% (209).

Table 3: Demographic characteristics of TB patients

Variable		Percentage (%)
Age group (in years)	16-19	8.4
	20-40	57.9
	Above 40	33.6
	Total	100
Gender	Male	63.2
	Female	36.8
	Total	100
Category of treatment	Cat I	75.7
	Cat II	24.3
	Total	100
HIV status	Negative	29.9
	Positive	65.1
	Unknown	5.0
	Total	100

3.1 LEVEL OF ADHERENCE TO TB THERAPY

Of the 321 TB patients, as shown in figure 2, theoverall percentage of patients who completed treatment was the highest (69%)followed by that of patients who died during treatment (16%) which was only 1% higher than those who defaulted. Only less than 1% interruptedtheir treatment.

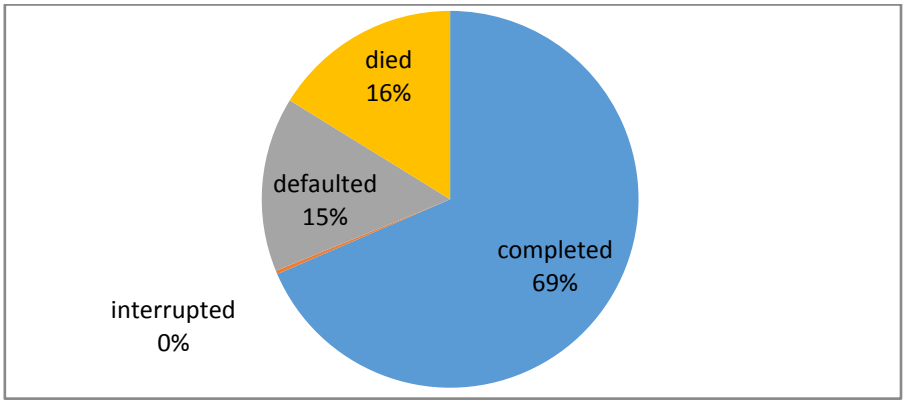

Figure 2: Percentage of patient adherence to TB therapy

3.2 LEVEL OF ADHERENCE BASED ON PATIENT'S AGE GROUP

The rate of treatment completion was lower in older patients (above 40 years) than in the younger ones. A larger percentage of patients who defaulted was observed in younger patients (age group 16-19 years) while

patients who are over 40 years recorded a higher percentage of those who died during treatment (table 4).There was statistical significant association between the patient's age group and the level of adherence to TB therapy (P=0.053).

Table 4: level of patient adherence to TB therapy based on the patient's age groups by cross tabulations

			Age in years will be divided into groups			Total
	Level of adherence		16-19	20-40	above 40	
	Completed		74.1%	73.1%	59.3%	68.5%
	Interrupted		.0%	.0%	.9%	.3%
	Defaulted		18.5%	14.5%	14.8%	15.0%
	Died		7.4%	12.4%	25.0%	16.2%
Total			100.0%	100.0%	100.0%	100.0%

3.3 **LEVEL OF ADHERENCE BASED ON TB PATIENT'S GENDER**

As shown in table 5, the percentage of patients who completed treatment was about 4% higher in female than in male TB patients. The percentage of male defaulters was more than female defaulters but the percentage of patients who died during treatment was the same in both female and male TB patients. The patient's gender had no statistical significant with the level of adherence to TB therapy (P=0.0704).

Table 5: level of patient adherence to TB therapy based on the patient's sex

			Patient's sex		Total
	Level of adherence		Male	Female	
	Completed		67.0%	71.2%	68.5%
	Interrupted		.5%	.0%	.3%
	Defaulted		16.3%	12.7%	15.0%
	Died		16.3%	16.1%	16.2%
Total			100.0%	100.0%	100.0%

P=0.0704 by chi square test

3.4 **LEVEL OF TB PATIENT ADHERENCE BASED ON CATEGORY OF TREATMENT.**

The percentages of patients who completed and died during treatment were almost the same in both category I and II patients (68% and 69% respectively).The rate of defaulters was slightly higher (by about 5%) in category I than in category II patients (table 6). There was no significant statistical association between the patient's treatment category and adherence to TB therapy (P=0.249)

Table 6; patient adherence to TB therapy based on category of treatment.

			Treatment category		Total
	Level of adherence		CAT I	CAT II	
	completed		68.3%	69.2%	68.5%
	interrupted		.0%	1.3%	.3%
	defaulted		16.0%	11.5%	15.0%
	died		15.6%	17.9%	16.2%
Total			100.0%	100.0%	100.0%

P=0.249 by chi square test

3.5 **LEVEL OF TB PATIENT ADHERENCE BASED ON PATIENT'S HIV STATUS**

The percentage of patients who completed TB treatment was higher in HIV negative patients (by 6%) than the HIV positive patients. The lowest percentage of treatment completion was recorded in patients with unknown HIV status. Patients with unknown HIV status also recorded a very high defaulter rate (Table 7).The percentage of patients who died during treatment was higher in HIV positive patients than in HIV negative patients (by about 6%). There was statistical significant association between the patient's HIV status and the level of adherence (P=0.001).

Table 7: Patient adherence in relation to HIV status.

			HIV status			Total
			negative	positive	unknown	
	Level of adherence Completed		74.0%	69.9%	18.8%	68.5%
	Interrupted		1.0%	.0%	.0%	.3%
	Defaulted		14.6%	13.4%	37.5%	15.0%
	Died		10.4%	16.7%	43.8%	16.2%
Total			100.0%	100.0%	100.0%	100.0%

P=0.001by chi square test.

DISCUSSION

4.1 LEVEL OF ADHERENCE

This study found the treatment completion rate to be at 69%, defaulter rate at 15%, 16% death rate and treatment interruption to be at 1% .The rate of defaulters in this study is almost similar to those of the Limpopo district in South Africa which recorded 13.2% (Dladla, 2013) and 13.6% of the Ethiopian Gondar district (Adane 2013). The 15% defaulter rate results in this study shows an improvement as compared to the findings in the study which was conducted in Ndola, Zambia which recorded a 29.8% defaulter rate (Kaona et al., 2004). Improvement in the defaulter rate could be due to patient's awareness programs on adherence which have been intensified by the ministry of health as observed during data collection. Despite such an improvement in the defaulter rate, the completion rate is still very low compared to the recommended levels of above 90% (Adane et al., 2013).

4.2 LEVEL OF ADHERENCE BY PATIENT'S AGE GROUP

In this study we found a slight significant association between the patients group and the level of adherence. The findings were consistent with the findings by such researchers as Anyaike et al., (2013). We also found that older patients (above 40 years) had a lower treatment completion rate as well as a higher number of deaths during therapy. Patients between the ages 16-19 were found to record a larger percentage of defaulters.

4.3 LEVEL OF ADHERENCE BY PATIENT'S GENDER

In this study, we found that the rate of treatment completion was slightly higher in female patients than in the male patients. Also male patients had a slight higher defaulter rate than their female counterparts but both male and female recorded the same percentage of patients who died during treatment. The study however, did not find any significant association between the patient's gender and the level of adherence to TB therapy

4.4 LEVEL OF ADHERENCE BY PATIENT'S TREATMENT CATEGORY.

In this study we found the percentage of patients who completed and died during treatment to be almost the same in category I and II patients. Although the defaulter rate was slightly higher in category I patients, the study did not find any significancy association between patient's category of treatment and the level of adherence (P value 0.249).

4.5 LEVEL OF ADHERENCE BY PATIENTS HIV STATUS

This study found that the percentage of defaulters was high in HIV/TB co-infected patients (37.5%) than their non HIV counterparts who only recorded 14.5% .Also HIV negative patients were found to have a higher completion rate than the HIV positive patients. HIV/TB co infection was significantly associated with TB treatment adherence (P=0.001). Theresults of the HIV positive defaulters in this study were higher than the 21.7% of HIV patients reported in Brazil (Maluza et al.,2011). The higher percentage of defaulters in HIV/TB co infected patients could be due to pill burden and unbearable side effects of both drugs.

CONCLUSION

This study therefore, found that 69% of patients completed TB treatment, 15% defaulted and 16% died during therapy. The study did not find any significant association between patient's sex and category of treatment with patient adherence to TB treatment. The study however found a slight significant association between the patient's age groups and a higher significant association between the patient's HIV status and adherence to TB treatment.

RECOMMENDATIONS

Although the findings of this study shows an improvement in the defaulter rates, Treatment completions rates are still very low hence the need for the ministry of health together with cooperating partners to come up with TB policies to further promote patient adherence to TB therapy. Also further studies need to be carried out to determine reasons for the high numbers of deaths in HIV/TB co infected patients on TB therapy.

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