Research Paper

Factors Influencing Non Adherence to Directly Observed Treatment Short Course among Patients with Tuberculosis in Selected Secondary Health Facilities, Ibadan, Oyo State, Nigeria

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ABSTRACT: *Tuberculosis is a global threat that contributes to disease burden especially in developing countries including Nigeria. Effect of non adherence to directly observed treatments short course (DOTS) leads to continuous infectivity, development of drug resistance and increased mortality associated with Tuberculosis (TB). Therefore, the objective of this study is to identify factors influencing non adherence to directly observed treatments short course among patients with tuberculosis. The study utilized descriptive research design survey. The sample consisted of 163 patients with Tuberculosis using simple random sampling technique. A self-developed structured questionnaire with reliability index of 0.832 was used to collect data. Data collected were coded and analysed using SPSS version 25. Descriptive statistics of frequencies, percentages were used to answer the research questions while the stated hypotheses were analysed using regression. The results from the study revealed high level of non-adherence to DOTS, low level of knowledge on TB treatment. The results further revealed a significant relationship between socio-demographic factors, knowledge of TB treatment and non-adherence to TB medications at 0.05 level of significance. Therefore, the study established a very high level of non-adherence of TB patients to DOTS which is associated with sociodemographic factors and level of knowledge on TB treatments. It is recommended that the stakeholders in the management of TB patient should ensure frequent health educations, increase the numbers of health worker, reduce the duration of time spent in the hospital, improve follow up strategies, and other policies that can lead to improve adherence of TB patients to DOTs*
KEY WORDS: *Tuberculosis, Patient, Non-adherence, Treatment, DOT*

I. INTRODUCTION

Tuberculosis (TB) is an infectious that contributes to disease burden globally especially in developing countries including Nigeria. Nigeria is ranked 7th among the 30 high TB burden countries globally and 2nd in Africa, accounting for 4% of the estimated incidence cases globally [1][2]. Every year around 249000 Nigerians die from tuberculosis and about 590000 new cases occur, this account for more than 10% death rate in Nigeria [3]. Despite current global efforts to reduce TB, Nigeria's TB prevalence is increasing in many communities, including the south west [4]. Evidence suggests that over 80% of TB cases are still undetected and undiagnosed the high incidence rates of TB may be one of the reasons Nigeria is considered one of the 30 high burden countries for TB and drug resistant TB, [1].

The disease is preventable and curable, however, the main strategy to combat the disease is strict adherence to directly observed treatments short course (DOTS) by taking several strong antibiotics daily for at least 6 month, but many patients fail to complete these treatments [1][5]. More so, majority of patients often feels better soon after starting treatment and stop following the treatment course. In view of this, World Health Organization implement a strategy known as Directly Observed Treatments Short Course (D0TS) with the aim of improving TB control and adherence needed by the patients to halt the global TB epidemics. Nevertheless,

despite all the efforts put in place, there is still drug resistance and poor prognosis of TB management which is attributed to non-adherence of patient to DOTS [6].

Non-Adherence to directly observed treatments short course is a complex health care problem that contributes to drug resistance among TB patients [7][8][9]. This does not only worsen the case but also paves a way for incidence of drug resistance and death [7]. In addition, non adherence to recommended treatments regimen may lead to the uncontrolled spread of TB infections, the occurrence of adverse drug reactions, morbidity and incidence of opportunistic infections and increased mortality rate. According to [10], non-adherence to directly observed treatments short course was attributed to positive and negative attributes inherent in the health system, social or family issues, personal factors and drugs factors.

Horsburgh, Barry & Lange [11] reported that treatments Adherence is the only remedy to the prevalence of tuberculosis and this has made the establishment of directly observed treatments short course to be an important tool in eradicating tuberculosis. However about half of all TB patients worldwide fail to complete the treatments regimen, making tuberculosis a global health problem [11]. Although, DOTS has helped in the control of TB in Nigeria however, there are factors that undermine TB control in Nigeria which include TB patient s characteristics, inaccessibility to DOTS centers, perceived quality of care inability to afford high quality TB care as well as patients' non-adherence to treatments. In furtherance to this [12] stated that in Nigeria, Most states including Oyo state has significantly worse health indicators than the national averages, with reference to weakened and fragile health system due to underinvestment and poor financial management, poor budgeting and a limited supply of essential medicines and equipment with exception of factors influencing patients' adherence to treatment. Therefore, this study aims to examine the factors that influence TB patients' adherence to TB Directly Observed Treatments Short Course in secondary health facilities Oyo state, Nigeria. This study was guided by the following research questions

i.   What is the knowledge of TB patients on Directly Observed Treatments Short Course (DOTS)?
ii.   What is the level of non-adherence of TB patients to Directly Observed Treatments Short Course (DOTS).
iii.   What are the factors that influence Patients' non-adherence to Directly Observed Treatments Short Course (DOTS).

II.   MATERIALS AND METHODS

Design: The study utilized descriptive research design. The study population comprised patients that Tuberculosis (TB) at Jericho Specialist Hospital, Jericho Chest Hospital and Ring Road State Hospital, Ibadan, Oyo State. The sample consisted of 163 TB patients attending chest clinic in selected hospitals using random sampling technique. The sample size was calculated using Taro Yamane formula $(n=N/1+N(d)^2$. n=sample size, N=238, d=0.05 which corresponds to 95% confidence level.

Settings: The study was conducted among TB patients attending chest clinic at Jericho Specialist Hospital, Jericho Chest Hospital and Ring Road State Hospital, Ibadan, Oyo State using simple random sampling technique.

Instrument: A self-developed structured questionnaire was used to elicit information from the participants. The data gathering tools were; socio-demographic characteristics consisting of 6 items such as age, gender, ethnicity, religion, marital status, level of education, employment status, occupation; knowledge of patients on DOTS, consisting of seven (7) concepts with 'Yes' and 'No' response. The highest possible score was 14 and lowest possible score was 1, the higher the score the greater the knowledge about DOTS. Score between 1-7 was considered low while the score between 8-14 was considered high; Patients' non-adherence to DOTS consists of 6 items on a likert scale response: SA = Strongly Agree, A = Agree ,N =Neutral ,D= Disagree, SD =strongly disagree .

The instrument for data collection was subjected to face and content validity .The items in the questionnaire was presented to experts in the test and measurement in nursing field and the project supervisor for review, corrections and appraisal after necessary corrections were made. Face validity involved reviewed of the instrument by expert also including members of the faculty scrutinize it for face relevance and acceptance to what it claimed to measure as it was subjected to face validity. Expert ensured that the items on the questionnaire represent adequately the concepts, and measured the subject matter and the questionnaires were numbered for easy retrieval. To reduce response error a pilot study was conducted among 18 post-operative patients in another setting with similar characteristics with the research setting.

The corrected and validated version of the instrument was administered to sixteen patients in a different setting from the selected facilities, Jericho Nursing Home. The overall instrument was tested for reliability using Cronbach alpha with reliability index of 0.832.

Statistical Analysis: Data obtained were coded and analysed using statistical package for social sciences (IBM SPSS) version 25.0; variables were analyzed using descriptive statistics of frequency table, percentages, mean

and standard deviation while hypothesis were tested using Pearson Product Moment correlation coefficient at 0.05 level of significance.

Ethical Consideration: Ethical approval for the study was collected from Babcock University Health Research Ethics Committee (BUHREC) with reference number 279/21. Also, the researcher had obligation to the subjects by getting their informed consent consistent with the principle of individual autonomy. Their voluntary participation, anonymity, privacy and confidentiality when collecting the data were also guaranteed. Their right to participate and not to participate was duly respected and any respondents that want to opt out during the study were allowed.

III. RESULTS

Table 1:Socio - Demography Characteristics of the respondents (n=163)

Questions	Response	Frequency	Percentage
Age	20-30	14	8.6
	31-40	26	16.0
	41-50	54	33.1
	51-60	31	19.0
	61	38	23.3
Sex	Male	60	36.8
	Female	103	63.2
Religion	Islam	81	49.7
	Christianity	57	35.0
	Traditional	25	15.3
Ethnicity	Yoruba	85	52.1
	Igbo	40	24.5
	Hausa	32	19.6
	Others	6	3.7
Marital status	Single	25	15.3
	Married	86	52.8
	Separated	33	20.2
	Widow	19	11.7
Education level	Primary	50	30.7
	Secondary	72	44.1
	Tertiary	24	14.8
	None	17	10.4
Employment status	Employed	46	28.2
	Unemployed	45	27.6
	Self-employed	72	44.2

Thirty-three point one percent of the respondents were between ages 41-50 years, 63.2% were female, 49.7% were Muslims, 52.1% were Yoruba, 52.8 were married, 44.1% had secondary level of education while 44.2% were self-employed. Descriptive statistics of socio-demographic characteristics are presented in Table 1.

Table 2: Knowledge of TB patients on DOTs

| ITEMS	Yes (%)	No (%)	Mean	S.D
TB medications will take at least 6 month for completion.	68(41.8)	95(58.2)	**1.56**	**0.70**
Medications must be completed before the disease will be cure.	67(41.1)	96(58.9)	**1.58**	**0.68**
Medications should be stopped immediately the TB sign disappears.	43(26.4)	120(73.6)	**1.18**	**0.56**
TB drugs have some side effects.	52(32.1)	111(67.9)	**1.40**	**0.64**
If the drugs are stopped suddenly, the effect of the drugs will be poor in the body.	117(71.8)	46(28.2)	**1.63**	**0.63**
The drugs will continue to work if you miss a day.	53(32.5)	110(67.5)	**1.20**	**0.64**
Irregular use of medications will lead to more disease problems in the body.	25(15.4)	138(84.6)	**1.45**	**0.75**
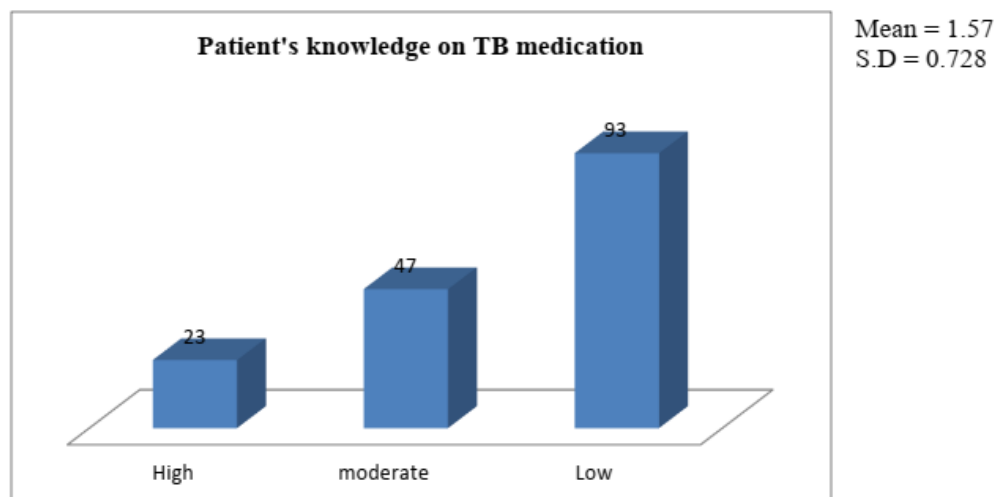
Figure 1: Summary of Knowledge of TB patients on DOTs

Fifty-seven point one percent of the respondents had low level of knowledge on DOTS, 28.8 had moderate knowledge while 14.1 had high knowledge of DOTS.

Table 3: Non – Adherence to DOTs among the TB patients

| ITEMS	SA	A	N	D	SD	Mean	S.D
Sometimes forget to come to the hospital	48 (29.4%)	32 (19.6%)	41 (25.2%)	28 (17.2%)	14 (8.6%)	**3.44**	**1.31**
Felt condition is under control decide not visit the hospital for my drugs	36 (22.1%)	65 (39.9%)	37 (22.7%)	17 (10.4%)	8 (4.9%)	**3.64**	**1.09**
Remember to take my drugs along when travelling	12 (7.4%)	29 (17.8%)	46 (28.2%)	56 (34.4%)	20 (12.3%)	**2.73**	**1.12**
Always take my drug when necessary	8 (4.9%)	28 (17.2%)	73 (44.8%)	45 (27.6%)	9 (5.5%)	**2.88**	**0.93**
Force to take drug by significant others	20 (12.3%)	68 (41.7%)	36 (22.1%)	30 (18.4%)	9 (5.5%)	**3.37**	**1.09**
Always follow medication dosage according to prescription	4 (2.5%)	21 (12.9%)	65 (39.9%)	53 (32.5%)	20 (12.3%)	**2.61**	**0.95**
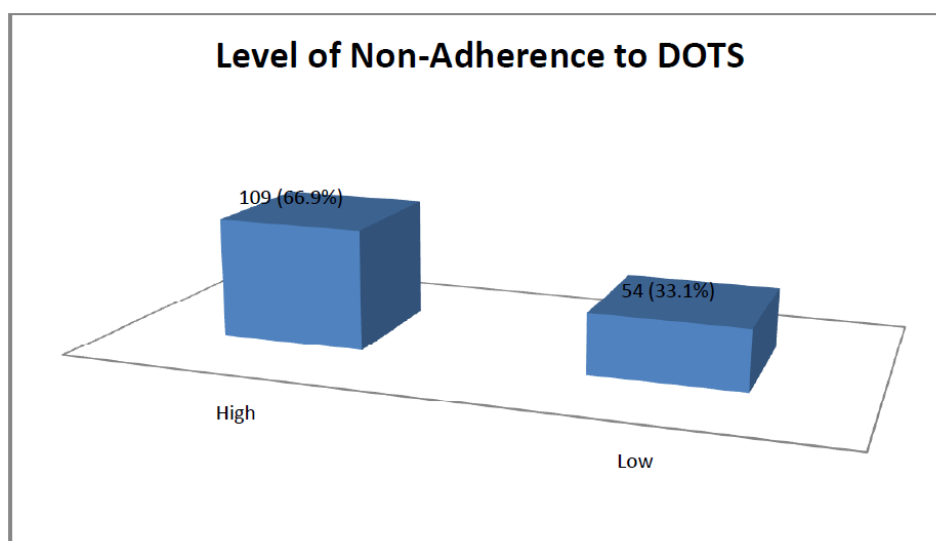
Figure 2: Summary of patients' level of non-adherence with DOTS

Table 4a: Relationship between socio-demographic factors level of non-adherence of T.B patients to (DOTs)

R = .629
R^2 = .395
Adjusted R^2 = .368
Std. Error of the Estimate = 1.38035

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	192.963	7	27.566	14.468	.000[b]
	Residual	295.331	155	1.905		
	Total	488.294	162			

a. Dependent Variable: Level of Non-Adherence to DOTS
b. Predictors: (Constant), Age, gender, Tribe, Marital status, Religion, Educational Level, Employment Status

Table 4b: Relative influence of Socio-demographic factors on patients' Non-Adherence level to DOTS
Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	11.862	.687		17.276	.000
Age	-.038	.119	-.027	-.322	.748
Sex	.159	.244	.044	.650	.517
Tribe	.988	.137	.511	7.200	.000
Religion	.587	.188	.248	3.130	.002
Marital status	.225	.120	.145	1.879	.062
Educational Background	-.839	.177	-.354	-4.741	.000
Employment Status	.507	.147	.245	3.453	.001

a. Dependent Variable: Level of non-adherence to DOTs

As presented in table 4, the table show that tribe ($\beta = 0.511, t(162) = 7.200, p < 0.05$), educational background ($\beta = -0.354, t(162) = 4.741, p < 0.05$), religion ($\beta = 0.248, t(162) = 3.130, p < 0.05$), employment status ($\beta = 0.245, t(162) = 3.453, p < 0.05$) have significant influence on the level of TB patients' non-adherence to DOTs in the order of magnitude while marital status ($\beta = 0.145, t(162) = 1.879, p > 0.05$), sex ($\beta = 0.044, t(162) = -.650, p > 0.05$) and age ($\beta = -0.027, t(162)0.332, p > 0.05$) have no significant influence on the level of TB patients' non-adherence to DOTs respectively.

Table 5: Relationship between socio-demographic factors level of non-adherence of T.B patients to (DOTS)

Variables	Mean	SD	N	R	P	Remark
Knowledge of DOTs	16.8160	1.85339	219	0.776[**]	0.000	Sig
Level of non – adherence to DOTS	14.8712	1. 73613				

**. Correlation is significant at the 0.01 level (2-tailed).

As presented in Table 5, there is correlation between knowledge and patients' non-adherence to DOTS. This result shows r = 0.776[**] and P = 0.000, which was less than 0.05 level of significance. This indicated that there was significant and positive correction between knowledge of DOTS and the level of non-adherence to DOTS. Null hypothesis was rejected and alternate was accepted. Hence, deduction was made that there was significant association between patients' knowledge of DOTS and level of non-adherence to DOTS in the study area.

IV.   Discussion

The findings from the study showed low level of DOTS among TB patients attending chest clinic. Majority of the patient had no knowledge of duration of DOTS and uncertain of when the medication should be stopped. This study implies that measuring patient level of knowledge about DOTS has become an important parameter in controlling the burden of disease and improving management of TB patients. This is in line with the findings of [13] that patients have relative poor knowledge on TB medication and high level of non-adherence to TB medication. Similarly, [14]) found that knowledge of TB medication among patients was very low and has aggravated their non-adherence to treatment regimen. In contrast to the result from the findings, [15] found that patients with TB have good knowledge on the medication and that they knew that the disease is infectious, and believed to be cured while adhered to TB medications. This indicated that good perception of the treatment influenced good knowledge about TB. Likewise, poor perception of TB medication could also influence poor knowledge about the condition.

The finding from the study also revealed high level of non-adherence with DOTS among TB patients as majority of the patients claimed that they usually forget to come to the clinic, some reported that they may decide not to come for their medications when they felt well at a time while some also indicated that they are always take their drugs when they are forced or persuaded by others. This study is in tandem with the report of [16] that non – adherence to DOTs was poor due to patients forgetfulness, lack of knowledge on the consequence of default and drug resistance. This study also corroborate the study conducted by [12] that poor knowledge on the disease and its consequences is a major factor in non – adherence to TB treatments regimen.

The results from the study also showed that ANOVA indicated a significant relationship between socio-demographic characteristics and level of non-adherence to DOTS. However, coefficient result revealed no significant association between age, gender and marital status. This study is in tandem with the result of [17]) that age and marital status has no statistically significant association with non-adherence with Tb medications. The results from the study is also partly in contrast with the result of [18]that there is a significant relationship between age, gender and marital status, level of education , employment status and adherence with DOTS. However, percentage of adherence was high among female patients, thus this denotes that male are more likely to be non-adherence to TB treatment regimen [18] also suggested that male partners are the greater risk of non-adherence to DOTS which was attributed to the fact that male are breadwinners and as the head of household. Moreso, female had a higher adherence level compared to their male counterpart [17]. This is supported by [20][21] that women were significantly likely to adhere to TB medications than men. In general, the Study established that demographic characteristics were associated with non- adherence to TB treatment. Specifically, education background and employment status (P=0.000). in agreement with the results of this study, [22] stated that patients with higher level of education were more likely to have high adherence level to TB regimen than with no formal education.

Additionally, the findingss from the study showed a significant relationship between knowledge and level of non-adherence to DOTS. The result corroborate with the findings of [24] that poor awareness especially regarding symptoms and treatment results and consequence were reported to have been associated with treatment non-completion. Moreso, [24] stated that majority of TB patients have no adequate knowledge of tuberculosis and were not utilizing the DOTS service, particularly in younger age groups, people living in a combined family, with no education, poor economic position, and from rural areas. Also [25] a positive relationship between knowledge and attitude of TB patients towards adherence to DOTS. Therefore knowledge of tuberculosis and directly observed treatment short course is a significant predictor of non-adherence to TB management.

V.   Conclusion

Non adherence to medication is a complex and multi-dimensional health care problem especially among patients with Tuberculosis (TB) and this is associated with many factors. This study examined the factors influencing non-adherence of TB patient to Directly Observed Short Course (DOTS). Findings from the study showed low level of knowledge on the management course of TB treatment regimen among TB patients which was translated into high level of non-adherence to DOTS as observed from the study. The result also shows a positive relationship between soci-demographic characteristics, knowledge and level of non-adherence to DOTS. The factors of significant importance identified in the study that influence non-adherence to DOTS include socio-demographic factors of educational background and employment status as well as know;ledge of the patients on the management of TB. Therefore, it is recommended that the stakeholders in the management of TB patient should ensure frequent health educations, increase the numbers of health worker, reduce the duration of time spent in the hospital, improve follow up strategies, and other policies that can lead to improve adherence of TB patients to DOTs

Limitation of the study: Factors influencing **n**on- adherence to DOTs is a complex problem as it also influenced individuals status of recovery, multiple factors may also be the cause of non –adherence which may not appear in the study. Also, some participant felt reluctant initially during the course of data collection but later agreed to participate after thorough explanation of the importance of the study

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