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Original Research Article

Perspectives on Determinants of Poor Adherence to Anti-Tuberculosis Drugs amongst Patients Attending a Tuberculosis Treatment Center in South East, Nigeria

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Abstract: ***Background of the study*:** Tuberculosis is curable and preventable as long as the infected patients take their medication as prescribed without interruption and all preventive measures observed both within the hospital and the community. Adherence to tuberculosis treatment by tuberculosis patients is key to the global control of tuberculosis. ***Methods*:** This cross sectional study was carried out at the Mile-4 hospital, a tuberculosis treatment center in Abakaliki, Ebonyi State, Nigeria. A total of 125 tuberculosis patients were recruited for the study and self-administered questionnaires and focus group discussions were used to get responses from the patients. Descriptive and inferential statistics with the aid of SPSS version 20 was used for data analysis. ***Results*:** Major reasons given for missing appointment and not following treatment schedule closely were lack of money, long distance from health facility, inadequate health education and non provision of food. Lack of money and long distance from health facility accounted for 60.9% of the reasons for not adhering to the treatment schedule by the tuberculosis patients. ***Conclusion*:** Adherence to tuberculosis treatment can be facilitated by extensive health education, minimal financial support and provision of food to tuberculosis patients. Distance from health facilities is also very important in the adherence to anti tuberculosis therapy by tuberculosis patients.

Keywords: Tuberculosis, Treatment adherence, Knowledge, Healthcare, health-seeking.

INTRODUCTION

Tuberculosis is an infectious bacterial disease caused by mycobacterium tuberculosis which most commonly affects the lungs. Mycobacterium tuberculosis was first isolated in 1882 by a German physician, Robert Koch [1]. Tuberculosis is curable and preventable. Over all, one-third of the world's population is currently infected with the tubercle bacilli [1, 2]. Tuberculosis is second only to HIV/AIDS as the greatest killer worldwide due to a single infectious agent [3, 4].

Tuberculosis is among the ten leading causes of death among men and women of reproductive age (15-49 years) and hospital admission across public and private health institutions in Nigeria. Nigeria ranks 4th in the burden of tuberculosis in Africa after South Africa, Ethiopia, and DR Congo [5]. The country has an estimated 320,000 cases of all forms of tuberculosis with yearly prevalence of 199,000 cases per 100,000 cases and 210,000 new cases representing an incidence rate of 133 per 100,000 population [5, 6].

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Adherence is defined by WHO as the extent to which a person's behavior = taking medication, following a diet or executing a lifestyle change corresponds with agreed recommendation from a healthcare provider [5-8]. Adherence is a concept that allows for a comprehensive assessment of factors related to medication intake such as characteristics of the regimen, attitudes of the providers, socio-economic, cultural and environmental factors [9-12]. Non adherence to treatment is a major barrier to global tuberculosis control and it has been shown that the most common cause of treatment failure and acquired resistance in tuberculosis management is non adherence [13-16]. Poor adherence to treatment is common despite various interventions aimed at improving treatment completion. Non adherence to tuberculosis treatment decreases the chances of cure, increases the risk of relapse after treatment and enhances the development of drug-resistant TB strains [17-19].

Lack of comprehensive and holistic understanding of barriers and facilitators of treatment adherence is currently a major obstacle to finding effective solution to tuberculosis control (20-22). Up to half of the patients with tuberculosis do not complete treatment and this contributes to prolonged infectiveness, drug resistance, relapse and death [20, 23, 24]. The concomitant use of anti-TB drugs with other medications like anti-retroviral drugs has been identified as one of the major reasons for defaulting in TB treatment [24, 25]. The continuation phase of treatment has also been found to be the most crucial time for interruption of treatment by tuberculosis patients [18, 25-27].

In 2021, across the world, 82% of deaths from tuberculosis occurred in African and Southeast regions of the world health organization (WHO). The total number of deaths from tuberculosis in 2021 was 1.4 million [2, 28]. To treat tuberculosis disease and prevent acquired drug resistance, the clinicians must ensure that TB patients follow the recommended courses of treatment. However, ensuring that patients adhere to treatment can be difficult because patients are often unable or reluctant to take multiple medications for several months. The responsibility for successful treatment is assigned to the healthcare provider, NOT the patient [4, 28-30].

MATERIALS AND METHODS

Study site

The study was carried out at the tuberculosis center of Mile-4 Hospital, Abakaliki, Ebonyi state, Nigeria. Mile-4 hospital is a faith-based hospital owned by the Medical Missionary of Mary (M.M.M) in Ebonyi state, southeast Nigeria.

Study design

A descriptive cross-sectional study of tuberculosis patients on the continuation phase of tuberculosis treatment at the tuberculosis center of Mile-4 hospital, Abakaliki, Ebonyi state, Nigeria. Tuberculosis patients registered for treatment at least 3 months before the start of the study, aged 15years and above, diagnosed by sputum AFB microscopy or chest x-ray and not critically ill were included in the study.

Instruments for data collection

Interviewer-administered questionnaire. Focus Group Discussions (FGDs). Focus group discussions were organized for: Male tuberculosis patients, female tuberculosis patients, literate tuberculosis patients and non -literate tuberculosis patients. Each group comprised of eight randomly selected tuberculosis patients.

Data management and analysis

Data collected using questionnaire were cleaned and double-checked to ensure consistency of information. The data were analyzed using descriptive and inferential statistics with the aid of the statistical package for social sciences (SPSS) version 20. Descriptive statistics was presented as frequency tables. Univariate and multivariate logistic regression analysis were used to draw inferences on the responses of the study participants as P-value of 0.05 or less were considered significant.

The focus group discussion was recorded on audio tape. This was played and notes were taken and transcribed.

RESULTS

Sociodemographic profile of patients

Table 1 shows that a total of 125 patients were recruited for the study out of which 40.0% were 15-30years old, 36.0% were 31-45years, 20.0% were 46-60years, 8.0% (61-75years) and those above 75years made up 2% of the patients used in the study.

Those with tertiary education constituted 13.6% of the patients, 46.6% had secondary education, 26.4% had primary education and 13.6% had no formal education. Employed patients made 12.0% of the patients in the study, unemployed, 24.8%, farmers, 30.4%, patient doing business made up 22.4% while 9.6% were students. Those that earned no income comprised 27.2% of the patients, 24.0% earned less than ₦10,000, 44.0% earned between ₦10,000 – ₦50,000 and 4.8% earned above ₦50,000.

Table 1: The socio-demographic profile of the patients (see page 5)

Characteristics	N = 125, n (%)
Sex	
Male	72(57.6)
Female	53(42.4)
Age group.	
15-30yrs	50(40.0)
31-45yrs	45 (36.0)
46-60yrs	20 (16.0)
61-75yrs	8 (6.4)
Above 75yrs	2 (1.6)
Ethnic Group	
Igbo	122(97.6).
Others	3 (2.4).
Marital Status	
Married	85 (68.0).
Single	37(29.6).
Divorced	1(0.8).
Widowed	2 (1.6).
Educational Qualification	
Tertiary	17 (13.6).
Secondary	58 (46.4).
Primary	33 (26.4).
None	17 (13.6).
Occupation	
Employed	15 (12.0).
Unemployed	31 (24.8).
Retired	1(0.8).
Business	28 (22.4).
Farming	38 (30.4).
Students	12 (9.6).
Monthly Income	
No income	34 (27.2).
Less than ₦10,000	30 (24.0).
₦10,000- ₦50,000	55 (44.0).
More than ₦50,000	6 (4.8).

PATIENTS' KNOWLEDGE OF TUBERCULOSIS

Table 2 shows that out of the 125 patients studied, 123 patients (98.4%) believed tuberculosis is an infectious disease, while 2 (1.6%) did not believe that tuberculosis is an infectious disease. Ninety nine patients (79.2%) said tuberculosis was an African disease and 26 patients (20.8%) said it was a worldwide disease. On the route of transmission of tuberculosis, 75.2% believed it is transmitted through inhalation, 9.6% said through blood, 5.6% said through physical contact, 7.2% believed it could be transmitted through blood, inhalation and physical contact, 2.4% did not known the route of transmission of tuberculosis.

Table 2: The patients' knowledge about tuberculosis (see page 5)

Responses	N = 125, n (%)
Tuberculosis is an infectious disease	
Yes	123(98.4).
No	2(1.6).
Tuberculosis is an African disease	
Yes	26(20.8).
No	99(79.2).
Tuberculosis is transmitted through	
Blood	12(9.6).
Inhalation	94(75.2).
Physical contact	7(5.6).
All of the above	9(7.2).
I don't know	3(2.4).

Responses	N = 125, n (%)
Tuberculosis can be spread by indiscriminate coughing and spitting by an infected person	
Yes	119(95.2)
No	4(3.2)
Don't know	2(1.6)
A person with cough and fever for over 3 weeks should present to a doctor	
Yes	117(93.6)
No	8(6.4)
Only people with HIV have Tb	
Yes	5(4.0)
No	118(94.4)
Don't know	2(1.6)
TB can be easily cured if you take your medication	
Yes	121(96.8)
No	1(0.8)
Don't know	3(2.4)
Multi-drug resistant TB takes many months to treat	
Yes	105(84.0)
No	19(15.2)
Don't know	1(0.8)

PERCENTAGE SCORE OF THE KNOWLEDGE OF TUBERCULOSIS

Table 3 shows the percentage score on the knowledge of tuberculosis which was recorded after scoring and grading the response of patients to questions bothering on the signs and symptoms of tuberculosis, mode of transmission, duration of treatment, development of drug resistance, relationship between tuberculosis and HIV/AIDS, and the prevention of tuberculosis. Thirty nine patients scored 86.7%, 31 patients scored 80.0%, 6 scored 60.0%, and 10 patients scored 93.3%.

Table 4 shows the different grades of the tuberculosis score by the patients. The scores were graded as follows: (1) Low knowledge for scores less than 70.0% (2) Average knowledge for scores of 70.0-80.0% (3) High knowledge for scores above 80.0%.

From the scores and grades recorded, 39.2% of the patients had a high knowledge of tuberculosis, 41.6% had an average knowledge and 19.2% had a low knowledge of tuberculosis.

Table 3: The percentage score of patients' knowledge about tuberculosis, (See page 6)

Score	N= 125, n(%).
53.3	1(8.0).
60.0	6(4.8).
73.3	21(16.8).
80.0	31(24.8).
86.7	39(31.2).
93.3	10(8.0).

Table 4: Knowledge grade of Tuberculosis score (See page 7)

Score	N=125, n(%).
Low knowledge (<70%)	24(19.2).
Average knowledge (70-80%)	52(41.6).
High knowledge (>80%)	49(39.2).

HEALTH SEEKING BEHAVIOUR

Table 5 shows the health-seeking behavior of the tuberculosis patients. A total of 36.6% of the patients visited government hospitals when they fell sick, 21.6% visited private clinics, 28.8% visited pharmacy/drug stores, 6.4% visited religious healers and 5.6% did nothing. Fourteen patients (11.2%) sought medical help immediately after falling sick, 62 patients (49.6%) sought help after one week, 12 patients (9.6%), after 2days while 29 (23.2%) sought help between 3 days to 1 week. Distance from health facility accounted for 18.0% of the reasons for delayed attempt to seek medical help, cost of treatment accounted for 44.8% and fear accounted for 8.0%.

Table 5: The patients' health-seeking behavior (See page 7)

Responses	N = 125, n (%)
When you fall sick, what do you do?	
Nothing	7(5.6).
Visit traditional healer	8(6.4).
Visit religious healer	3(2.4).
Visit government hospitals	42(33.6).
Visit private clinics	27(21.6).
Visit pharmacy store	36(28.8).
Others (Tell my children, until it become severe)	29(1.6).
How early do you seek help medically?	
Immediately	14(11.2).
The next day	8(6.4).
After 2 days	12(9.6).
Between 3days and 1week	29(23.2).
One week or more.	62(49.6).
Why do you usually delay seeking help medically?	
Fear	10(8.0).
Cost	56(44.8).
Distance	23(18.4).
Gender	1(0.8).
Nothing	13(10.4).
Others (pill burden, lack of time, visit the chemist, believe in traditional medicine, believe in God's healing)	22(17.6).
If you think you have tuberculosis, who do you tell?	
Relationsk	80(64.0).
Friends	5(4.0).
A nurse	23(18.4).
Traditional healer	7(5.6).
Religious healer	1(0.8).
Nobody	2(1.6).
If you think you have tuberculosis where do you go for help?	
Visit traditional healer	3(2.4).
Visit religious healers	1(0.8).
Visit government hospitals	37(29.6).
Visit private clinico	73(58.4).
Visit pharmacy/drug store	11(8.8).
Are there obstacles to your healthcare?	
Yes	41(32.8).
No	84(67.2).

Treatment regimen and adhering to appointment by tuberculosis patients

Table 6 shows the responses to the treatment regimen/adherence to clinic appointment by the tuberculosis patients. Forty patients (32.0%) took four tablets a day, 64 patients (51.2%) took three tablets a day, 19 patients (15.2%) took two tablets a day and 2 patients (1.6%) took one tablet a day. One hundred and twenty two patients (97.6%) took their drugs once a day, two patients (1.6%), twice a day and one patient (0.8%), three times a day. Of all the patients, 71.2% are on anti-TB drugs only, while 28.8% are on other drugs in aside from the anti-TB drugs.

Table 6: Treatment regimen/adherence to appointment to the clinic (see page 7)

Responses	N = 125, n (%)
How many times do you take your TB drugs a day?	
Once	122(97.6).
Twice	2(1.6).
Three times	1(0.8).
How many tablets do you take a day?	
One	2(1.6).
Two	19(15.2).
Three	64(51.2).
Four	40(32.0).

Responses	N = 125, n (%)
Are you taking other medications apart from that of TB?	
Yes	36(28.8).
No	89(71.2).
Have you ever missed your clinic appointment	
Yes	32(25.6).
No	93(74.4).
When was the last time you missed any of your medication?	
Within the past week	4(3.2).
1-2weeks ago	22(17.6).
2-4weeks ago	7(5.6).
1-3months	3(2.4).
More than 3months	4(3.2).
Never skipped my medication	85(68.0).
What do you do when you miss your medication?	
Report to the healthcare providers	59(47.2).
Take a double dose next time	4(3.2).
Nothing	5(4.0).
Take my medication twice a day	2(1.6).
Others (wait till next appointment, tell my children, rush to the hospital)	55(44.0)
Why did you miss your appointment?	
Was away from home	16(12.8).
Simply forgot	2(1.6).
Had too many pills to take	6(4.8).
Ran out of pills	11(8.8).
Had a change of route	2(1.6).
Never missed	88(70.4).

Focus Group Discussion

The focus group discussion was broken into four parts: (1) Male TB Patients (2) Female TB Patients (3) Literate TB patients (4) Illiterate TB Patients. On the knowledge of TB, the male tuberculosis patients believed that TB could be transmitted from one person to another, that anything about tuberculosis brings about neglect and disrespect. Tuberculosis is a poor man's disease. One of the female TB patients said that "tuberculosis is a cough a child experiences immediately after delivery by the mother". The literate TB patients said TB could spread from person to person, that it is a deadly disease that affects the lungs.

The illiterate group said TB is a cough that produces sputum and later turns to blood. All the groups believed that TB is a worldwide disease and that if you don't take your drugs you could develop resistant form of TB.

DISCUSSION

This study examined the effect of socio-demographic factors, knowledge of Tuberculosis, health seeking behavior, and treatment regimen on adherence to Tuberculosis treatment during the continuation phase of treatment at the Mile 4 TB hospital at Abakaliki, Ebonyi State, Southeast, Nigeria.

In this study, Tuberculosis was found to predominantly affect patients aged 15-30years. This age range forms the active productive group of the country and the world at large. The economic implication of this development is therefore huge. This finding is similar to the study done by Kendall in 2020 [20] in which chemical urine tests were used to evaluate the rate of adherence in Human immune deficiency (HIV) patients receiving anti-tuberculosis drugs. This finding however varies from other studies conducted in the past [18, 31].

Married patients that constituted 68.0% of the study population were also more affected by tuberculosis than single unmarried patients in this study. This may be due to the fact that married people have more responsibility owing to the family exigencies than unmarried people hence are more likely to pay less attention to their health than the unmarried people. This finding compares to the study done by Ruru *et al*., in 2018 [32] in India.

Distance from health facility and lack of money accounted for 60.9% of the obstacle encountered towards adherence by the tuberculosis patients. Long distance from health facility and lack of money has earlier been found to be associated with treatment failure in a study done by Shargie *et al*., [11]. There are other studies with similar findings globally [4, 10, 13].

Reasons cited for missing appointments included: no money for transport (62.5%, being away from home (25.0%) and long distance from health facility (9.4%). These findings are consistent with those found in the study done by Inotu and Abebe [33] in which assessment of defaulting from Directly Observed

Treatment Short Course (DOTS) and its determinants were studied using 772 patients in Nigeria. Some studies however cited directly observed therapy short course (DOTS), long duration of treatment and adverse drug events as barriers to adherence to tuberculosis treatment [8, 17, 18, 44].

None of the socio-demographic factors had effect on adherence in this study (P-Value >0.05). This is similar to the study done by Namukwaya *et al*., 2011 [34] in Uganda and the study done in Spain by Cayla *et al*., in 2009 [35] and Chiang *et al*., 2023 [8] in Peru, South America.

In this study, more males (57.6%) than females (42.4%) were affected by tuberculosis with a male to female ratio of 1.4:1. This is similar to the findings in the other studies done across the globe [29, 31, 36].

In the focus group discussion with literate, illiterate, female and male TB patients, all the patients said that they never missed their appointment. They attributed this to proper health education given by the health workers [1, 26, 37]. The patients however pointed out that there was no provision for transport fares, nutritional supplements or home visits to enforce adherence to TB treatment. This in my opinion would have been an added encouragement towards medication intake and keeping of appointments to the TB clinic by the patients.

Health-seeking behavior was found to be associated with missing of clinic appointment and compliance with medication intake in the study (P-Value <0.011). This conforms with the findings of other studies [14, 17, 38].

Knowledge of tuberculosis and treatment regimen however had no association with non-adherence (P.Value >0.05). This contrasts with the findings of the other studies done (4,29). These researchers found that knowledge of TB and treatment regimen was associated with adherence to tuberculosis treatment.

The strength of this study is that it was carried out in the major TB treatment center in Ebonyi State, Nigeria which serves as a referral center for tuberculosis treatment in southeast, Nigeria. The study was also carried out under a routine program conditions in the state thus reflecting the reality on ground [1, 9, 40].

However, conducting longitudinal studies with a wider range of respondents and the use of combination of adherence assessment tools will give a better assessment of adherence and factors affecting adherence to tuberculosis in the longer term [13, 18, 29, 42-44].

CONCLUSION

The current global emergence of multi-drug resistant Tuberculosis and extensively drug resistant tuberculosis underscores the importance of enforcing adherence to tuberculosis treatment by tuberculosis patients worldwide. To this end, directly observed treatment short course (DOTS) should be pursued with every seriousness globally to ensure adherence to Tuberculosis treatment.

Our findings suggest that provision of food, nutritional supplements, and minimal financial support might facilitate adherence to tuberculosis treatment.

Ethical approval

Ethical approval was obtained from the Human Research and Ethics Committee, Federal Teaching Hospital, Abakaliki, Ebonyi State, Nigeria. Permission for the study was given by the management of Mile-4 Hospital, Abakaliki, Ebonyi State, Nigeria.

Limitations of the study

The study focused only on patients' perspectives about TB treatment. It did not explore the providers' viewpoints. Future research efforts can investigate providers' experience to elucidate additional factors that influence TB treatment adherence in this context.

Authorship: CCO and EOO conceptualized and designed the study, participated in data collection and analysis and approval of the final manuscript. PCA, SNU, EOO, BNW, DOA, UO and GCA participated in data analysis and drafting of the manuscript. CCO, GCA and EOO supervised the data collection, reviewed the manuscript for intellectual content. All the authors read and approved the final manuscript for submission.

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