

Knowledge of tuberculosis and prevalence of return after default and treatment failure among patients on directly observed treatment short course therapy at Specialist Hospital, Sokoto, Nigeria

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ABSTRACT

Background: Tuberculosis (TB) is a major public health problem in Nigeria, and the TB burden is further compounded by the high prevalence of human immunodeficiency virus in the country. This study was conducted to assess the knowledge of TB and prevalence of return after default and treatment failure among patients on directly observed treatment short course (DOTS) therapy at Specialist Hospital, Sokoto, Nigeria.

Materials and Methods: A cross-sectional study was conducted among 75 patients on DOTS for TB. Data were collected with a set of structured interviewer-administered questionnaire. Data on patients' treatment profile were also extracted from their case files and entered into a proforma.

Results: A larger proportion 32 (42.6%) of the 75 patients were aged 21–30 years. Majority of respondents 58 (77.3%) had adequate knowledge of TB, and it was significantly associated ($P < 0.05$) with having secondary and tertiary education. Ten (13.3%) of the 75 respondents have ever stopped taking their anti-TB drugs during the course of their treatment. Of these, majority 6 (60.0%) attributed it to forgetfulness. None of the respondents had treatment failure or fulfilled the criteria to be categorized as return after default.

Conclusion: This study showed a high level of knowledge of TB, good compliance with treatment, and absence of return after default and treatment failure among the study participants. These findings underscore the pivotal role of education of members of the public and patients in facilitating appropriate health-seeking behavior, compliance with treatment, and favorable treatment outcome.

Key words: Knowledge, prevalence, return after default, treatment failure, tuberculosis

INTRODUCTION

Tuberculosis (TB) is the ninth leading cause of death worldwide and the leading cause from a single infectious agent, ranking above human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS). In 2016, there were an estimated 1.3 million TB deaths among HIV-negative people (down from 1.7 million in 2000) and an additional 3,74,000 deaths among HIV-positive people.^[1]

Over 95% of TB deaths occur in low- and middle-income countries, and it is among the top three causes of death for women aged 15–44 years. In 2009, there were about 10 million orphan children as a result of TB deaths among parents.^[2]

TB is a major public health problem in Nigeria; the country is one of the 14 countries that featured in all the three high-burden countries lists of 30 countries each with the highest burden of

TB, the highest TB and HIV co-infection (TB/HIV), and multidrug-resistant TB (MDR-TB).^[3] The TB burden in Nigeria is further compounded by the high HIV prevalence in the country; the recorded HIV prevalence among TB patients increased from 2.2% in 1991 to about 27% in 2008, and HIV is the most important risk factor for developing TB disease.^[4] Of serious concern is the fact that the incidence of TB is expected to increase substantially not only in Nigeria but also worldwide, during the next 10 years because of the interaction between the TB and HIV epidemics and the emerging MDR-TB.^[4]

It is known that most deaths from TB could be prevented with early diagnosis and appropriate treatment. Although millions of people are diagnosed and successfully treated for TB each year (averting about 53 million deaths from the year 2000 to 2016), there are still large gaps in detection and treatment. Only 22% of the estimated incidence of drug-resistant TB was detected, and treatment success remains low, at 54% globally.^[1]

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Poor knowledge of TB among patients, default from treatment, and treatment failure have hampered many TB control programs, and they pose serious threats to the eradication of the disease globally.^[5] Return after default is a TB patient who completed at least 4 weeks of treatment and returned smear-positive after at least 8 weeks' period of interruption of treatment, whereas treatment failure refers to a smear-positive patient who while on treatment remains or becomes smear positive again 5 months or later after the commencement of treatment.^[4]

It is believed that good knowledge of TB by patients increases their acceptance of TB control measures and decreases disease transmission,^[6] whereas non-adherence to treatment often results from inadequate knowledge or understanding of the disease and its treatment.^[7] Findings from several studies across Africa showed poor knowledge of TB among patients. A study conducted among TB patients in seven hospitals in rural and semi-rural districts of Arusha, Tanzania, reported poor knowledge of human and bovine TB transmission among the respondents, particularly those from nomadic tribes.^[8] In another study among TB patients in Mwanza, Tanzania, only 30% of the respondents had satisfactory knowledge of disease treatment.^[9]

Treatment failure poses serious threats to TB control programs in many countries across the world. Cases tend to have higher mortality and remain infectious for prolonged periods of time, and this increases the risk of transmitting the disease to other members of the community.^[5] In a study conducted among 1254 patients on treatment for pulmonary TB at various treatment centers in Ibadan, Nigeria, treatment failure was recorded in 8.1% and default in 6.6%; and patients with poor knowledge had a higher risk of poor treatment outcome.^[10] Similarly, about 20% of defaulters in the Vietnam TB Control Program lacked knowledge about the disease and its treatment.^[11]

While a study conducted among TB patients at Mulago Hospital, Uganda,^[12] found a strong link between poor adherence to anti-TB treatment and treatment failure, another study among patients on treatment for TB in Morocco discovered positive feedback effects in both patients with default and treatment failure. Retreatment failure was most common among patients who have had an initial treatment failure (24%), and default from retreatment was most frequent among patients with initial treatment default (57%).^[13] Studies on the prevalence of return after default and treatment failure among patients on directly observed treatment short course (DOTS) are limited. This study aimed to assess the knowledge of TB and prevalence of return after default and treatment failure among patients on DOTS therapy at Specialist Hospital, Sokoto, Nigeria.

MATERIALS AND METHODS

Study Design and Population

A cross-sectional study was conducted among patients on DOTS for TB at the Specialist Hospital, Sokoto, Nigeria, between July and September 2014. All the patients that have been on DOTS for at least 4 months and consented to participate in the study were enrolled consecutively for the period of the study.

Data Collection

A structured, interviewer-administered questionnaire was developed and used to obtain information on participants'

sociodemographic characteristics and knowledge of TB. It was reviewed by researchers in the Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria, to ascertain content validity. The questionnaire was pretested on 15 patients on DOTS treatment at Mabera Clinic, Sokoto, Nigeria. Some questions were rephrased for clarity based on the observations made during the pretesting. Two resident doctors assisted in questionnaire administration after being trained on the conduct of survey research, the objectives of the study, and administration of survey instrument. A proforma was used to obtain information on patients' treatment profile (extracted from their case files).

Data Analysis

Data were analyzed using the IBM SPSS Version 20 statistical computer software package. Respondents' knowledge of TB was scored and graded on a 21-point scale. One point was awarded for a correct response, while a wrong response or a non-response received no points. This gives a minimum score of "0" and a maximum score of "21" points. Those that scored ≥ 13 of 20 points were considered as having "adequate" knowledge, while those that scored < 13 of 21 points were graded as having "inadequate" knowledge. Frequency distribution tables were constructed, and cross-tabulations were done to examine the relationship between categorical variables. The Chi-square test was used to compare differences between proportions. All levels of significance were set at $P < 0.05$.

Ethical Consideration

Institutional Ethical Clearance was obtained from the Ethical Committee of Sokoto State Ministry of Health, Sokoto, Nigeria. Permission to conduct the study was obtained from the Management of the Hospital, and informed written consent was also obtained from the participants before questionnaire administration.

RESULTS

Sociodemographic Characteristics of Respondents

All the questionnaires administered to the 75 patients enrolled in the study were completely filled and used for analysis giving a response rate of 100%. A larger proportion of respondents 32 (42.6%) were aged 21–30 years. Majority of respondents were males (70.7%) and married (64.0%). The respondents were predominantly Muslims (98.7%), majority of them had primary education and below (58.7%), and only about a quarter of respondents (26.7%) were unemployed [Table 1].

Respondents' Knowledge of TB

The knowledge of symptoms and signs, risk factors, and prevention of TB among the respondents is presented in Table 2. Although none of the respondents knew the causative agent of TB, majority of them knew the signs and symptoms of the disease. The signs and symptoms of TB most commonly known to the respondents were weight loss (90.7%), fever (86.7%), chest pain (85.3%), cough with blood (76.0%), and cough lasting 3 weeks or more (72.0%). Majority of respondents knew the risk factors of TB with the most commonly known risk factors being close contact with a patient with TB (82.7%), overcrowding (73.3%), poor ventilation (73.3%), and poor nutrition (70.7%). Only about

a third of respondents knew consumption of unpasteurized milk (33.3%) and debilitating diseases such as HIV/AIDS (38.6%) and diabetes mellitus (33.3%) as risk factors of TB. Most of the respondents knew the preventive measures for TB, with the most commonly known preventive measures being control of the risk factors of the disease (81.3%) and bacillus Calmette-Guérin vaccination (77.3%). Most of the respondents (90.7%) knew that TB is curable. Majority of respondents 58 (77.3%) had adequate knowledge of TB, and it was significantly associated with having secondary and tertiary education ($\chi^2 = 3.956, P = 0.047$).

Respondents' Treatment Profile

Ten (13.3%) of the 75 respondents have ever stopped taking their anti-TB drugs during the course of their treatment. Of these, majority 6 (60.0%) attributed it to forgetfulness, 2 (20.0%) attributed it to drug side effects, 1 (10.0%) attributed it to the long distance of health facility from home, and 1 (10.0%) attributed it to symptoms being mild. None of the respondents had treatment failure or fulfilled the criteria to be categorized as return after default [Table 3].

DISCUSSION

Most of the patients in this study (73.3%) were aged 11–40 years, and a larger proportion (42.6%) were aged 21–30 years; this is similar to the finding in a study conducted in Ilorin, Nigeria,^[14] in which most of the patients (75.3%) were aged 16–45 years, and another study in Bauchi, Nigeria,^[15] in which most of the patients (70%) were aged 15–44 years. Other studies conducted across Nigeria including Gombe^[16] and Ibadan^[10] also reported relatively young patients with mean age of 36.8 ± 12.4 and 35.0 ± 3.3 years, respectively. These findings are in consonance with the submissions in the Nigeria TB Fact Sheet 2010 that showed that TB most commonly affects the productive age groups with the 25–34 years age group accounting for 33.6% of the smear-positive cases in the country in 2010.^[17] The predilection of TB for the relatively young and productive age group in Nigeria perfectly mirrors the epidemiology of the HIV infection in the country which not only commonly affects young persons but also with the highest prevalence (5.6%) in the 25–29 years age group.^[18] Noticeably, the high prevalence of HIV in Nigeria which stands at 4.1% in the general population has compounded the TB burden in the country. The prevalence of HIV among TB patients increased from 2.2% in 1991 to 19.1% in 2001 and 25% in 2010, thus indicating that the TB situation in the country is HIV-driven.^[17] This is corroborated by the fact that in addition to Nigeria being ranked the second with the highest number of new HIV infections each year worldwide,^[19] the number of new cases of all forms of TB in the country remains concomitantly high, with a current estimate of 407,000 cases (equivalent to 219/100,000 population) in the year 2016.^[20] This is of serious concern in view of the implications on the socioeconomic development of the country, and it brings to the fore the fact that control of TB is contingent on control of HIV in Nigeria. It is therefore imperative for Government to integrate TB and HIV control programs in Nigeria.

Majority of the respondents in this study (77.3%) had adequate knowledge of TB, and it was significantly associated with having secondary and tertiary education. This finding is in consonance with the finding in studies by Hoa *et al.*^[11] and Berisha *et al.*^[21]

Table 1: Sociodemographic characteristics of respondents

Variables	Frequency (%) n=75
Age group (in years)	
11–20	5 (6.7)
21–30	32 (42.6)
31–40	18 (24.0)
41–50	9 (12.0)
51–60	6 (8.0)
61–70	5 (6.7)
Sex	
Male	53 (70.7)
Female	22 (29.3)
Marital status	
Single	20 (26.6)
Married	48 (64.0)
Separated	1 (1.3)
Divorced	4 (5.3)
Widowed	2 (2.6)
Religion	
Islam	74 (98.7)
Christianity	1 (1.3)
Education	
Primary and below	44 (58.7)
Secondary and tertiary	31 (41.3)
Occupation	
Unemployed	20 (26.7)
Farming	8 (10.7)
Civil servant	11 (14.7)
Business	36 (48.0)

which reported the high level of TB among the patients studied; however, on the contrary, in a study by Wandwalo and Morkve,^[19] only 30% of the study population had satisfactory knowledge of TB, while in another study by Hashim *et al.*,^[22] only 64.4% of patients had good knowledge of TB. The finding of adequate knowledge of TB by the majority of the respondents in this study is reassuring in view of the documented evidence of higher likelihood of completion of treatment and better treatment outcomes among patients with adequate knowledge of TB in several studies.^[10,23] In addition to regular supply of anti-TB drugs at no cost to patients, education of patients on the diagnosis and treatment of TB is one of the core activities routinely observed (even before the diagnosis is made) in the National TB and Leprosy Control Program in Nigeria.^[24] The good knowledge of TB among the patients in this study indicates good compliance with this practice by the healthcare workers coordinating the program at Specialist Hospital, Sokoto, Nigeria, and the management of the hospital should encourage them to remain consistent. This is strongly supported by the finding in a study in Vietnam which reported generally high level of knowledge of TB among the patients studied, and 93% of the respondents reported receiving TB information from the health staff.^[11]

Although none of the respondents in this study knew the causative agent of TB, majority of respondents knew the symptoms and signs of the disease, the risk factors for its transmission, and the prevention of the disease. This is contrary to the finding in a study among TB patients in Dares Salam, Tanzania,^[25] where only about a third (35.9%) of the respondents had good knowledge of the

Table 2: Respondents' knowledge of TB

Variables	Correct response frequency (%) n=75
Causative agent of TB (<i>M. tuberculosis</i>)	0 (0)
Symptoms and signs of TB	
Cough lasting >3 weeks	54 (72.0)
Cough with blood	57 (76.0)
Weight loss	68 (90.7)
Drenching night sweat	51 (68.0)
Fever	65 (86.7)
Chest pain	64 (85.3)
Difficulty with breathing	44 (58.7)
Sometimes no symptom	45 (60.0)
Risk factors of TB	
Overcrowding	55 (73.3)
Poor nutrition	53 (70.7)
HIV/AIDS	29 (38.6)
Diabetes mellitus	25 (33.3)
Poor ventilation	55 (73.3)
Close contact with TB patient	62 (82.7)
Consumption of unpasteurized milk	25 (33.3)
Poor hygiene (e.g., not covering mouth while coughing)	52 (69.3)
Prevention of TB	
BCG vaccination	58 (77.3)
Proper treatment of TB cases	35 (46.7)
Control of TB risk factors	61 (81.3)
TB is curable	68 (90.7)
Knowledge grade	
Adequate	58 (77.3)
Inadequate	17 (22.7)

M. tuberculosis: *Mycobacterium tuberculosis*, TB: Tuberculosis, HIV: Human immunodeficiency virus, AIDS: Acquired immunodeficiency syndrome, BCG: Bacillus Calmette-Guérin

Table 3: Respondents' treatment profile

Variables	Frequency (%)
Ever stopped taking anti-TB drugs (n=75)	
Yes	10 (13.3)
No	57 (76.0)
Reason for stopping anti-TB drugs (n=10)	
Forgetfulness	6 (60.0)
Long distance of health facility from home	1 (10.0)
Side effects of drugs	2 (20.0)
Symptoms were mild	1 (10.0)
Treatment outcome (n=75)	
Cured	75 (100)
Had treatment failure	0 (0)

TB: Tuberculosis

signs and symptoms of the disease, and poor knowledge of the signs and symptoms of the disease was found to be associated with delay in seeking care. The importance of seeking care early was clearly demonstrated in a study conducted among TB patients in Sharkia Governorate, Egypt,^[26] which reported late presentation (i.e. presenting with advanced disease demonstrated by cavities and extensive disease on the baseline chest radiograph) as a prominent predictor of treatment failure. Among the few respondents (13.3%) who have ever interrupted their treatment in this study, forgetfulness was the main reason given (60.0%), and only a few (20.0%) attributed it to drug side effects or relief of symptoms (10.0%). This finding differs from the finding in a study by Basa and Venkatesh,^[27] which reported a default rate of 7.5% and the main reasons for default were drug-toxicity (42.0%) and relief of symptoms (35.5%). Noticeably, none of the respondents in this study fulfilled the criteria for categorization as return after default, and none of them had treatment failure. The association between default and treatment failure has been established in several studies across the globe. A study conducted in Mulago Hospital, Uganda,^[12] found poor adherence to anti-TB treatment as a strong predictor of treatment failure (odds ratio [OR] = 14.59; 95% confidence interval [CI]: 3.04–70.15). In another study in Burkina Faso,^[28] failure to take TB drugs for more than 14 consecutive days was found to be an independent risk factor for treatment failure (OR = 18.53; 95% CI: 4.56–75.22). A study in Ibadan, Nigeria,^[10] reported a default rate of 6.6% and a treatment failure rate of 8.1%. Similarly, another study in Ilorin, Nigeria,^[14] reported default rates of 22.3% and 14.0% and treatment failure rates of 7.2 and 7.9% among males and females, respectively. The absence of return after default and treatment failure among the respondents in the study could be due to the adequate knowledge of TB by most of them, thus facilitating early presentation at the hospital and compliance with treatment and it underscores the pivotal role of education of members of the public and patients in facilitating appropriate health-seeking behavior, compliance with treatment, and favorable treatment outcome.

CONCLUSION

This study showed a high level of knowledge of TB, good compliance with treatment, and absence of return after default and treatment failure among the study participants. These findings underscore the pivotal role of education of members of the public and patients in facilitating appropriate health-seeking behavior, compliance with treatment, and favorable treatment outcome.

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