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Clinical Study

Prevalence of Treatment Failure among Pulmonary Tuberculosis Patients in Federal Medical Centre, Gombe, Northeastern Nigeria

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Treatment failure in patients with pulmonary tuberculosis poses a great danger to the global effort in control of tuberculosis. This study evaluated prevalence of treatment failure among pulmonary tuberculosis patients at Federal Medical Centre (FMC) Gombe, Nigeria. Consecutive patients managed between August 2008 and August 2009 at the Directly Observed Therapy (Tuberculosis) Unit of our hospital were enrolled for the study. Sputum specimens were collected from each patient at entry for Acid Fast Bacilli and repeated at the end of 2nd, 5th and 7th month of treatment. Of the 247 patients recruited, 200 patients consisting of 118 (59%) males and 82 (41%) females aged 15–78 years with a mean of 36.8 ± 12.4 years completed the study. One hundred and fifteen (57.5%) of the patients were sputum smear positive at entry while 85 (42%) were negative. Among 115 smear positive patients at baseline, 80 patients (69.6%), 26 (22.6%) and 24 (20.9%) remained positive after 2nd, 5th and 7th month of treatment respectively. In conclusion, there is a high treatment failure rate (22.6%) among our TB patients; and this poses a great danger to healthcare personnel and close contacts in the community.

1. Introduction

Tuberculosis is a major cause of lower respiratory tract infection in many developing countries of the world including Sub-Saharan Africa [1, 2]. The global strategy of World Health Organization (WHO) for the control of tuberculosis (TB), the Directly Observed Treatment Strategy (DOTS) recommends the use of short-course chemotherapy. This is to ensure drug compliance and increase cure rates of patients with TB. Treatment outcomes according to internationally accepted definitions [3] includes cure, treatment completion, treatment failure, death, default, and transfer out. A cure is defined as having negative sputum at the end of eight months treatment in a patient with positive AFB at entry to treatment. Treatment failure is defined as persistence of sputum positivity for AFB while patient is on anti-TB treatment for 5 months or more or reversion to smear positivity after initial smear negative sputum following treatment for TB. This includes patients who were initially smear negative before starting treatment but became smear positive after the second month of treatment. Some of the factors associated with treatment failure include poor drug compliance, primary drug-resistant TB, lack of efficacious anti-TB drugs, and presence of comorbidities such as HIV infection and diabetes mellitus.

Prevalence of treatment failure among TB patients with pulmonary disease receiving treatment at DOTS clinics differs from one place to another and reflects the level of risk posed to close contacts of the patients as well as development of multidrug-resistant TB. It is important to prevent the emergence and transmission of drug-resistant TB because the second line drugs are less effective, have toxic side effects, and require extended treatment [4–6]. Moreover, treatment failure subsequently leads to higher mortality rates and relapse [7, 8]. However, it is worthy to note that once patients with TB are commenced on effective anti-TB chemotherapy, they rapidly become less infectious [9].

Nigeria is known to have the highest estimated number of new TB cases among the African countries [10–12]. Data regarding the prevalence of treatment failure of cases of TB

are scarce in the Northeastern part of Nigeria. The objective of this study therefore was to determine the prevalence of treatment failure among a cohort of smear positive pulmonary tuberculosis patients attending the DOT clinic in Federal Medical Centre (FMC), Gombe, Nigeria.

2. Material and Methods

The study was carried out in FMC Gombe, Northeastern Nigeria, and the study period was from August 2008 to August 2009. The research proposal was approved by the Ethics and Review Committee of the hospital, and informed consent was obtained from the patients. The hospital has a TB DOT clinic which is supported by the National Tuberculosis and Leprosy Control Program (NTLCP), Gombe state coordinating unit. Treatment procedures, laboratory diagnosis, and the drug regimens are provided according to the National Policy on TB and Leprosy control [10].

Consecutive patients who presented at the TB DOT unit of the hospital with pulmonary tuberculosis were enrolled. Sociodemographic data such as age, sex, marital status, and occupation were recorded. Patients with previous history of tuberculosis, living outside Gombe town, who have been commenced on antituberculosis therapy or have comorbid condition like diabetes mellitus, were excluded.

Before enrolling into the study, the patients were well informed on the consequences and potential predictors of treatment failure such as treatment compliance. Pretreatment sputum specimens were collected from each patient for acid fast bacilli (AFB) examination, and chest X-ray was reported as PTB by an experienced consultant radiologist supported by clinical features. HIV status of the patients was also determined using the serial algorism recommended by the World Health Organization (WHO). All the patients were followed up to completion of eight months Anti-TB treatment. Sputum examinations were repeated at 2 month, 5 months, and 7 month of treatment. Data were entered and analyzed using SPSS 16.0 version.

3. Results

A total of 247 patients were recruited during the one year study period (between August 2008 and August 2009). Forty-seven (47) patients were either transferred out or lost to follow up. Two hundred patients who completed their treatment at the centre were evaluated. There were 118 (59%) males and 82 (41%) females aged between 15 and 78 years with a mean age of 36.8 ± 12.4 years. Majority of the patients (38%) were within the age group 25–34 years. Only two patients (1%) were above 74 years (Table 1). One hundred and fifteen (57.5%) patients were sputum smear positive at entry while 85 (42.5%) were sputum smear negative. Out of the 200 patients, 73 (36.5%) were HIV positive (Table 2). Among patients who were smear positive for AFB ($n = 115$) at baseline, 41 (35.7%) were HIV positive, and 74 (64.3%) were HIV negative.

Table 3 shows the age group distribution of sputum positive AFB on entry and HIV infected patients. While majority of the patients with sputum smear positive were within age range of 25–34, most of the patients with HIV fell within 35–44 age group.

Table 1: Age distribution of study participants.

Age group (years)	Frequency	Percentage (%)
15–24	22	11
25–34	76	38
35–44	54	27
45–54	25	13
55–64	15	7
65–74	6	3
≥75	2	1

Table 2: HIV status of study participants.

HIV status	Frequency	Percentage (%)
Positive	73	36.5
Negative	127	63.5
Total	200	100

HIV: human immunodeficiency virus.

Table 3: Age distribution of AFB positive patients at entry and positive HIV serology.

Age group (years)	AFB +ve	HIV +ve
15–24	12	5
25–34	42	13
35–44	36	15
45–54	9	3
55–64	8	4
65–74	6	1
≥75	2	0
Total	115	41

AFB +ve: acid fast bacilli positive; HIV +ve: human immunodeficiency virus positive.

Repeat sputum AFB results in study participants who were smear positive at entry are presented in Table 4. One hundred and fifteen patients (57.5%) had sputum positive test for AFB at entry, and 85 (42.5%) patients were AFB negative. Of the 115 patients who were sputum positive at baseline, 80 patients (69.6%) were AFB smear positive after two months of intensive quadruple therapy, and 26 (22.6%) and 24 (20.9%) patients had positive AFB after 5 and 7 months therapy, respectively. Therefore the prevalence of treatment failure was 22.6% (percentage of those still positive after 5 months of treatment). Treatment failure rate among patients who were HIV positive was 26.8% compared with 18.9% among those that were HIV negative ($P = 0.32$).

4. Discussion

Our study showed that TB affects mainly the young in our environment (38% of the patients managed were within the 25–34-year-old age group) which is the most socioeconomically productive segment of the population unlike

Table 4: Serial sputum AFB results of study participants who were smear positive at entry (n-115).

AFB result	SS at entry freq (%)	SS at 2 months freq (%)	SS at 5 months freq (%)	SS at 7 months freq (%)
Positive	115	80 (69.6%)	26 (22.6%)	24 (20.9%)
Negative	None	35 (30.4%)	89 (77.4)	91 (79.1)
Total	115 (100)	115 (100)	115 (100%)	115 (100%)

AFB: acid fast bacilli; SS: sputum smear; freq: frequency.

developed countries where TB affects mainly the elderly [13]. This finding which is similar to reports from other developing countries has negative impact on the economy. Greater percentage of our study population was males which concur with other studies in southwestern Nigeria [11, 14]. One hundred and fifteen (57.5%) of the patients were sputum smear positive at entry while 85 (42.5%) were sputum smear negative. The import of this is that many patients present late to health facility and with smear positive disease mighty have infected many close contacts in the community. This together with poverty and ignorance is contributing to high prevalence of tuberculosis in our environment.

The result of this study showed that more than one-third of the patients (35.7%) were smear positive for AFB and had HIV. TB and HIV coinfection is one of the most significant global public health concerns because the combination of these two conditions negatively affects outcomes of both diseases. This has been shown in several studies in different countries [15–17]. However, this prevalence is much higher than that reported in Keffi Northcentral Nigeria [18] which showed 16.7% prevalence of HIV positivity in tuberculosis patients. The high prevalence in our study may be due to the fact that we routinely screen all TB patients for HIV in the DOTS clinic. Tuberculosis is one of the most common opportunistic infections (OI) occurring in HIV positive patients, and HIV screening can be easily performed using simple rapid tests which are available in most low-resource countries. There is need for aggressive HIV screening and lifelong prophylactic treatment with isoniazid to prevent TB infection in HIV patients.

The cure rate of 79.1% in our patients was slightly lower than 85% recommended by the World Health Organization guidelines [19]. This means that more effort is needed to further improve this cure rate from our centre being a tertiary health institution. Treatment failure rate among our patients was 22.6%. This is high and poses a significant risk to members of the public, close relatives, and health care staff who treat these patients. Treatment failure rate was 26.8% among TB who were HIV positive and 18.9% in those who were HIV negative ($P = 0.32$). Although, this difference did not reach statistical significance, TB/HIV coinfection probably contributed to high treatment failure rate observed in this study [20]. However, facilities for culture and drug sensitivity testing are not yet available in our center making it impossible to identify patients with primary and multi-drug resistant tuberculosis. Epidemic of tuberculosis had been reported among patients with multi-drug-resistant TB with complications including fatal meningitis and highly destructive lung disease occurring in such individuals. This type of patient must be isolated because of the risk of transmitting virtually untreatable drug-resistant microbes. Recently, total drug-resistant tuberculosis has been described in India in which some patients with TB infection were completely unresponsively to all TB drugs [21]. This is a big blow to the global effort in control of TB. On the other hand, additional burdens of isolation and stigmatization on the patients are enormous [8].

Noncompliance to treatment, deficient patient knowledge/health education, drug quality, and other comorbidities like diabetes mellitus had been identified as major predictors of treatment failure in patients with TB [22]. These factors were all excluded in our study participants. In a study in Ile-Ife, Nigeria, the only factor that significantly influenced the rate of compliance with antituberculosis treatment was proximity to the chest clinic [23]. Our patients who participated in this study resided within Gombe town, and the distance from their residence to the DOT centre was not more than five kilometers.

In conclusion, there is a high treatment failure rate among TB patients managed in our DOTS clinic, and HIV infection may be a risk factor for treatment failure. There is the need for provision of facility for sputum culture for detection of patients with primary and multi-drug-resistant TB cases. Policies on the management of individuals with drug-resistant tuberculosis need to be reviewed and strengthened in order to reduce open TB cases in the community.

Conflict of Interest

The authors declared that they have no conflict of interests.

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