

# Management Outcomes of Tuberculosis Cases in a Tertiary Hospital in Southwestern Nigeria

AA Salako<sup>1</sup> and OO Sholeye<sup>2\*</sup>

<sup>1</sup>Department of Community Medicine, Obafemi Awolowo College of Health Sciences, Olabisi Onabanjo University, Ogun state, Nigeria

<sup>2</sup>Department of Community Medicine, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state, Nigeria

## Summary

Nigeria is currently ranked 5<sup>th</sup> among the 22 high tuberculosis burden countries in the world. This paper analyses the management outcomes of hospitalized and ambulatory cases of tuberculosis in Olabisi Onabanjo University Teaching Hospital, Sagamu.

A retrospective study was conducted in September 2009, using the records of 263 hospitalized patients managed for tuberculosis between January 2000 and December 2002. Information on the management outcome of 308 ambulatory cases of tuberculosis managed by the community health clinic on directly observed therapy short course was also collected for the same time period for comparison. The case fatality rate of the hospitalized cases was found to be 17.1%, while that of the ambulatory cases was 5.2%. The mortality rate among those having co-infection (with TB/HIV) was found to be almost four times higher in the hospitalized cases than the ambulatory cases.

Intensification of tuberculosis health education involving the community health workers, early diagnosis and treatment with directly observed therapy short course and contact tracing are recommended to nosedive the high mortality associated with late presentation and complications resulting in hospital admissions.

**Keywords:** Tuberculosis; Directly observed therapy short course; Hospitalization; Case fatality rate

## Introduction

Nearly one-third of the global population, i.e. two billion people, are infected with mycobacterium tuberculosis and at risk of developing the disease, more than 8 million people develop active tuberculosis (TB) every year, and about two million people die [1,2]. Tuberculosis is one of the leading global causes of morbidity and mortality. According to the World Health Organisation (WHO), 2.4 million cases were reported in 2001 [3]. In 2010, there were 8.8 million incident cases of Tuberculosis, 1.1 million deaths from TB among HIV-negative people and an additional 0.35 million deaths from HIV-associated TB. Almost 10 million children were orphaned as a result of parental deaths from TB in 2009 [4].

More than 90% of global TB cases occur in the developing world, where 75% of cases are in the most economically productive age group (15-54 years). Therefore, an adult with TB loses an average of three to four months of work time, if treatment is delayed. This results in the loss of 20-30% of annual household income and if the patient dies of TB, an average of 15 years of lost income. In addition to the devastating economic cost, TB imposes indirect negative consequences; children leave school because of their parents' tuberculosis and women are abandoned by their families as a result of the disease. Nigeria is currently ranked 5<sup>th</sup> among the 22 high TB burden countries in the world [5]. With a 2006 estimated incidence of all new cases of TB of 311/100,000 population per year out of which 137/100,000 population are smear positive and prevalence of 616/100,000 population, the country has the second highest burden in Africa [6]. Co-infection with the Human Immunodeficiency virus (HIV) significantly increases the risk of developing TB. Countries with a high prevalence of HIV, particularly those in sub-Saharan Africa have witnessed a profound increase in the number of TB cases with reported incidence rates increasing two or three fold in the 1990. In spite of newer modalities for diagnosis and treatment of TB, millions of people are still suffering and dying from this disease. TB is one of the top three infectious killing diseases in the world: HIV/AIDS kills 3 million people each year, TB kills 2 million and malaria kills 1 million [7]. At the same

time, multi-drug resistance caused by poorly managed TB treatment, as well as epidemic trends, is a growing problem of serious concern in many countries around the world, particularly in regions where health care spending and health system efficiency are sub-optimal [1,2]. Despite the widespread availability of highly effective treatment drugs, tuberculosis still remains a global public health problem while it is still awarded a low priority in many developing countries [2]. TB is a completely curable disease through short-course chemotherapy. The key to controlling tuberculosis is the rapid detection and cure of infectious cases by tuberculosis control programmes. In 1991, the WHO recommended that the national tuberculosis control programmes should work towards objectives by the year 2000 to treat successfully 85% and to detect 70% of smear-positive cases by the introduction of an effective approach to tuberculosis control [2]. In 1993, the WHO declared tuberculosis to be a global emergency. The exact burden of the disease however is not known and the worldwide achievements of national tuberculosis control programmes in terms of diagnosis and treatment results have not been analyzed. The WHO recommends tuberculosis treatment using the DOTS strategy [2,7]. It is the internationally recommended strategy for TB control, proven to be highly efficient and cost-effective. The five main components of DOTS are: a sustained political will and financial commitment; diagnosis by quality-ensured sputum-smear microscopy; standardized short-course anti-TB treatment, given under direct and supportive observation (DOT); a regular, uninterrupted supply of high quality anti-TB drugs;

**\*Corresponding author:** OO Sholeye, Department of Community Medicine, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun state, Nigeria, Tel: +2348086177954; E-mail: [folasholeye@yahoo.com](mailto:folasholeye@yahoo.com)

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and standardized recording and reporting- monitoring and evaluation systems and impact measurement [8,9].

Worldwide, between 1995 and 2008, a cumulative total of 36 million TB patients were successfully treated in DOTS programs, and up to 6 million deaths were averted. The treatment success rate (86%) achieved in DOTS cohorts world wide exceeded the global target of 85% for the first time in 2007 [10-12]. The DOTS Strategy is considered to be a cost effective intervention at par with childhood immunization and control of diseases [10]. It was introduced to encourage adherence [13-15]. A study in Uganda found 89% of clients under clinic-based DOTS had successful outcomes following completion of tuberculosis therapy [16]. In recent times, WHO has evaluated TB control programmes in countries with high disease burdens. The Stop TB Strategy was launched with a goal to dramatically reduce the global burden of Tuberculosis by 2015. The six components of Stop TB strategy include: to pursue high-quality DOTS expansion and enhancement; address TB/HIV, multi-drug resistant TB and the needs of poor and vulnerable populations; contribute to health system strengthening, based on primary health care; engage all care providers; empower people with TB and communities through partnerships; and enable and promote research [17]. This paper examines and analyses the treatment outcomes of both hospitalized and ambulatory cases of TB in a tertiary health facility between January 2000 and December 2002.

## Methodology

### Study location

The study was carried out in Sagamu, a semi-urban town in Ogun State, southwestern Nigeria. The town has a multi-ethnic population, who are traders, farmers and civil servants. The teaching hospital is located at the centre of the town. The community medicine department runs the DOTS clinic, with home visits done by public health nurses from the department. Hospitalised patients are seen by the respiratologists (internists) and, upon discharge, are not referred to be part of the DOTS clinic.

### Materials and methods

With the aid of data sheet, relevant information was collected from the case notes of registered tuberculosis patients retrieved from the medical records department. Only records of patients admitted between Jan 2000–Dec 2002 were used. Information collected include

socio-demographic information (age, sex, etc.), the outcome of management, that is, whether discharged alive or dead or discharged against medical advice (DAMA).

During the same period, information on 308 ambulatory cases on DOTS therapy in the same hospital were collected and the treatment outcome as outlined by WHO was obtained. They were classified as follows:

**Cured:** Initially smear-positive patient who has negative sputum smear in the last month of treatment, and on at least one previous occasion;

**Completed treatment:** Patient who has completed treatment but does not meet the criteria for cure or failure;

**Died:** Patient who died during treatment, irrespective of cause;

**Failed:** Smear-positive patient who remained smear-positive, or became smear-positive again, at least 5 months after the start of treatment;

**Interrupted treatment (Defaulted):** Patient who did not collect drugs for 2 months or more at any time after registration;

**Transferred out:** Patient who was transferred to another reporting unit and for whom treatment results are not known;

**Successfully treated:** The sum of cases that were cured and that completed treatment (expressed as a percentage of the number registered in the cohort);

**Sputum conversion:** A sputum smear-positive case of tuberculosis on therapy should become sputum smear negative within 2–3 months of the commencement of chemotherapy.

## Ethical Approval

This was obtained from the institutional ethical review committee. Strict confidentiality with patients' records was ensured.

## Data Management

Data collected with the aid of data sheets, were checked for completeness after each day's work, prior to entry and analysis using SPSS 10.00. Means and proportions were calculated and were presented as Tables 1-3 and in prose form.

OUTCOME OF MANAGEMENT OF HOSPITALIZED TB CASES	Under1yr		1-4yrs		5-14yrs		15-45yrs		46 -65yrs		>65 yrs		Total		Grand Total	%
	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Discharged Life & Better	-	-	8	11	8	3	61	70	19	11	8	3	104	98	202	76.8
Died	-	-	1	-	-	1	14	17	6	3	2	1	23	22	45	17.1
DAMA*	-	-	-	1	2	-	9	2	1	-	-	-	13	3	16	6.1
TOTAL	-	-	9	12	10	4	84	89	26	14	10	4	140	123	263	100.0

\*DAMA: Discharged Against Medical Advice  
M- Male, F- Female

Table 1: Outcomes of Management of Hospitalized Cases of Kochs Disease Jan 2000 – Dec 2002.

Treatment Outcome of Ambulatory cases on DOTS at OOUTH	Year 2000/2001		Year 2001/2002		GRAND TOTAL	
	No	%	No	%	No	%
1. Cure Rates	93	63.7	118	72.8	211	68.5
2. Treatment Completed Rates (TCR)	11	7.5	15	9.3	26	8.4
3. Treatment Success Rate	104	71.2	133	82.1	237	76.9
4. Defaulters' Rates (%)	32	21.9	16	9.9	48	15.6
5. Case Fatality Rate (Mortality)	9	6.2	7	4.3	16	5.2
6. Multi-drug Resistance	1	0.7	4	2.5	5	1.6
7. Transferred out	0	0.0	2	1.2	2	0.6
	146		162		308	

Table 2: Treatment Outcome of Ambulatory Cases of Tuberculosis on Dots in OOUTH for 2000/2001 and 2001/2002.

## Results

263 cases were hospitalized for severe complications of tuberculosis for the three-year period between January 2000 and December 2002. The severe complications of tuberculosis ranged from sudden severe haemoptysis to severe anemia, pleural effusion, pneumothorax and pulmonary fibrosis. Period of admission of these cases ranged from 2 days to 81 days with a range of 79 days and a mean period of admission of  $8.1 \pm 6.0$  days. Their ages ranged from 2 - 75 years with a mean of  $30.9 \pm 14$  years. These patients were not on DOTS even prior to hospitalization. A total of 308 TB cases on DOTS programme were included in the study, with each case managed for a period of eight months. They were between the ages of 4-78 years with a mean of  $29.97 \pm 14.8$  years. The mortality (case fatality rates) from the 8-month duration chemotherapy for the 308 cases was 5.2% as compared to 17.1% of those hospitalized (NON DOTS) for severe complications arising from the disease. The mortality of the hospitalized cases of the disease was found to be more than 3 times higher. The discharged cases against medical advice (DAMA) were found to be 16 cases out of the 263 cases (16.1%) hospitalized between 2 days and 51 days. Two gave no reasons for their decision while the majority gave the reasons that the patient was not getting better or they wanted to try alternative medicine to orthodox management.

Table 2 shows the treatment outcome of cases on anti-tuberculosis chemotherapy (DOTS/SCC) in the community medicine clinic of the department of community medicine and primary care in the same tertiary hospital. The treatment success rate (TSR) which included the cure rates with treatment completed rates was found to be 76.9% (237 cases out of the 308 cases) presenting for the same period. The case fatality rate (CFR) for the two years was found to be 5.2% (16 out of 308 cases for the two-year period). On TB/HIV co-infection among the 263 hospitalized cases, 12 patients (4.6%) (6 males, 6 females) were found to be HIV positive, out of which 7 patients (3 males, 4 females) died, resulting in a mortality rate of 58.3% among those with TB/HIV co-infection. Among the 308 ambulatory cases on DOTS programme, 34 TB cases (11.0%) (14 males, 20 females) were found to be co-infected with HIV, out of which 5 (2 males and 3 females) died, resulting in a mortality rate of 14.7%. The mortality rate among those with co-infection was found to be almost four times higher in the hospitalized cases than the ambulatory cases on DOTS.

## Discussion

Tuberculosis is a disease with ancient origin. Over the past two to three centuries, TB has been responsible for approximately one billion cases of human disease [18]. Apart from the Acquired Immune Deficiency Syndrome (AIDS) pandemic, TB does not seem to decrease fast enough in developing countries because of ineffective immunization coverage and poor or ineffective control programs [19]. More importantly in Nigeria is the poor knowledge of microbial aetiology and the poor community perception of TB as an unnatural disease which must respond to traditional native drugs. The treatment options recommended under the National TB control programme are to delay the initiation of the antiretroviral drugs until the completion of the intensive phase of TB treatment after which antiretroviral drugs can

be commenced if the individual is not severely ill or has a CD4 count  $>200$ , drugs such as ethambutol and isoniazid used in the continuation phase have not been implicated in cross reaction with anti-retroviral drugs. With the increasing prevalence of TB/HIV co-infection, more TB/HIV infected patients may need to commence both antiretroviral drugs concurrently with anti-tuberculosis drugs. TB/HIV co-infection may demand the use of complex drugs which may require appropriate dose adjustments and monitoring to ensure optimum levels of anti-retroviral drugs and anti-tuberculosis drugs. However in patients requiring concurrent TB/HIV treatment, a NNRTI based regimen using Efavirenz (especially for males or women who have completed their family size because toxic side effects of Efavirenz on the foetus in-utero) may be more appropriate, even though this combination may not be cost effective. A study carried out in Northwest Ethiopia investigated the treatment outcome of 4000 tuberculosis patients in a five-year period. Tuberculosis type was categorized as extra-pulmonary in 1133 (28.3%), smear negative pulmonary tuberculosis in 2196 (54.9%) and smear positive pulmonary tuberculosis in 671 (16.8%) cases. Of all patients, treatment outcome was classified as successfully treated in 1181(29.5%), defaulted in 730 (18.3%), died in 403 (10.1%), treatment failed in six (0.2%) and transferred out in 1680 (42.0%) patients. Males had the trend to be more likely to experience death or default than females, and the elderly were more likely to die than younger. The proportion of default rate was increased across the years from 97(9.2%) to 228 (42.9%). Being female, age group 15-24 years, smear positive pulmonary tuberculosis and being urban resident were associated with higher treatment success rate [20]. Even though in this Ethiopian study, it was not stated whether the cases were ambulatory or hospitalized, it is clear that the case fatality rate among hospitalized cases is much higher than the Ethiopian case fatality rate of 10%. The death rate however is much lower in ambulatory cases in this study. In a study of the in-hospital mortality of disseminated tuberculosis in patients infected with HIV, the case fatality rate was high because of the co-infection with HIV and the TB cases were disseminated [21]. This study confirms the report that mortality rates in TB cases are much higher when they are co-infected with HIV. The case fatality rate is much higher among HIV co-infected individuals. A similar study was carried out at the Federal Medical Centre, Ido-Ekiti, Nigeria as a retrospective study of the case records of all suspected pulmonary tuberculosis patients on admission in the medical wards of the hospital between July 2003 and June 2007. 166 (9.9%) of 1680 admissions were pulmonary tuberculosis suspects, PTB was diagnosed in 69 (41.6%) patients with 28 and 41 smear positive and smear negative respectively. Of all the 69 diagnosed PTB cases; 7 (10.1%) died and 5 (7.2%) discharged against medical advice or absconded. However, the remaining 57 (82.6%) patients were registered for anti-TB treatment. After one month, two months, four months and six months after hospital discharge, 46 (80.7%), 37 (64.9%), 31 (54.4%), and 24 (42.1%) of the treatment-registered patients attended the follow-up out-patient clinic for clinical review and drug refills. The study showed that the tuberculosis control in Nigeria is in a crisis state. There is need for all stakeholders to find lasting solutions to failure of tuberculosis program in Nigeria and by extension, sub-Saharan Africa [22]. The case fatality rate of hospitalized patients (17.1%) was higher than that (10.1%) of the above mentioned study. The percentage of HIV infection among hospitalized TB patients was 4.6% and the percentage of HIV infection among ambulatory cases on DOTS was 11.0%. According the National Tuberculosis Control Programme record of the Federal Ministry of Health, the recorded HIV prevalence among TB patients increased from 2.2% in 1991 to about 30% in 2006 [6]. The findings in this study are consistent with the findings of the Federal ministry of Health information. WHO has a vision to reduce the burden of TB as a public health problem by 2050

TB/HIV CO-INFECTION	AMBULATORY CASES ON DOTS (N=34)			HOSPITALIZED CASES (N=12)		
	M	F	TOTAL (%)	M	F	TOTAL (%)
MORTALITY	2	3	5 (14.7%)	3	4	7 (58.3%)

**Table 3:** Mortality Data on Tb/Hiv Co-Infection among Hospitalized and Ambulatory Cases on Dots.

[23]. Since the targets for TB control by the National TB program are to detect at least 70% of the estimated infectious (smear-positive) cases, achieve a cure rate of at least 85% of the detected smear-positive cases, by 2015 reduce TB prevalence and death rates by 50% relative to 1990 level and by 2050 eliminate TB as a public health problem ( $< 1/1,000,000$  population). For effective TB control and to be able to meet the target of the Millennium Development Goals by 2015, it's important to adopt and follow effectively the components of the STOP TB strategy, engage and carry along all care providers (private and public), with emphasis on empowering people with TB and their communities [17]. This study particularly shows, as documented in literature, the effectiveness of the DOTS strategy in control of the infection [24-26]. The Community Medicine department alone runs DOTS (eight months) programs along with its outreach centre in town. The pulmonology unit does not treat TB patients using DOTS, whether infections are complicated or not. We do not mean there aren't limitations to DOTS strategy, particularly when complications like destroyed lung syndrome have set in, but advocates for placement of uncomplicated cases on the program, even at tertiary level. A limitation of the study is that data presented are of many years past, but it describes the management pattern of TB cases at the teaching hospital till date.

## Conclusion

This study has shown the difference in treatment outcomes between patients managed via the DOTS strategy and those managed as in-patient (hospitalized) cases. Cure rate, treatment completion rate and adherence were significantly higher in those on DOTS. It is therefore recommended that, tertiary centers include DOTS in their tuberculosis control programs, allowing community physicians, public health nurses and other well-trained personnel offer the best to clients. This will help in the early diagnosis and treatment of cases, contact tracing and the global effort to stop TB.

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