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TWO YEAR TREND ANALYSIS OF DEFAULT RATE IN TUBERCULOSIS PATIENTS IN FEDERAL MEDICAL CENTER, IDO-EKITI, EKITI STATE, NIGERIA

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ABSTRACT

Background: *Treatment default can foster emergence of drug resistant tuberculosis. This study was performed to analyze the trend of default and other treatment outcomes of patients with DOTS therapy in terms of relapse, failure and death.*

Methodology: *A descriptive cross-sectional study was carried out using records of all the 198 patients managed in the 2 year period (78 and 120 patients were reviewed in 2010 and 2011 respectively) at the Directly Observed Treatment Short-course (DOTS) Clinic of the Federal Medical Center Ido-Ekiti, Nigeria in year 2010. Information obtained from the hospital was entered into the SPSS computer software. Frequency tables and cross tabulations were generated and a p-value of less than 0.05 was statistically significant for the study.*

Result: *There is an increase in the number and percentage of tuberculosis patients that consented to HIV test and a lesser number of patients' defaulted treatment in 2011 (19.2%) as against 30.8% of patients that defaulted in 2010. Of the documented factors that affected treatment outcomes of*

the tuberculosis patients seen in the two years, consent for HIV testing had an overall statistically significant positive outcome. HIV co-infection is the only factor showing statistical significance out of the four factors affecting mortality in this study.

Conclusion: *Default rate is high. There is need to carry out an intervention to further minimize default rates and improve HIV testing among tuberculosis patients so as to set a template for good treatment outcome.*

Key Words: Consent, Default rate, HIV Co-infection, HIV testing, Tuberculosis

INTRODUCTION

Tuberculosis (TB) is second only to Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) as the greatest killer worldwide due to a single infectious agent (WHO, 2012a) accounting for 2.4% of the global burden of disease (FMOH, 2010). In 2010, 8.8 million people fell ill with Tuberculosis globally, and a total of 1.4 million people died as a result of the disease, most of these cases and deaths (about 95%) occurring in developing countries (WHO, 2012a). The disease which affects both adults and children remains a major cause of mortality despite availability of effective treatment (Burton *et al.*, 2011). The Human Immunodeficiency virus (HIV) epidemic has triggered an increase in the number of TB cases globally (WHO, 2012a). HIV infection and tuberculosis are common and often co-occurring conditions, forming a lethal combination, each speeding the other's progress, and resultant increase in mortality (WHO, 2012a,; (Pefura *et al.*, 2012). Also an issue of global concern presently is the emergence of drug-resistant tuberculosis, which is on the increase in many countries of the world (WHO, 2012b; (Woldeyohannes *et al.*, 2011).

Tuberculosis is both curable and preventable. The World Health Organization (WHO) recommended strategy for global tuberculosis control is a short-course, clinically administered treatment (Rojas *et al.*, 2010); WHO, 2010a). This Directly Observed Treatment short-course (DOTS) has been found to be an effective means of administering anti-TB drugs, significantly reducing the rates of relapse and drug resistance as well as improving the treatment compliance rate (Erhabor *et al.*, 2000; Erhabor *et al.*, 2003). Steady progress is being made globally towards achieving the Millennium Development Goal (MDG) 6, Target 8 which is to "Halt and begin to reverse the incidence of TB by 2015." Nonetheless, more efforts are needed to accelerate the rate of decline of TB prevalence and mortality in the WHO African region if the MDG and Stop TB Strategy's targets are to be met. Nigeria, being one of the 22 high burden countries for Tuberculosis in the world has a prevalence of 497 per 100, 000 population (FMOH, 2010; WHO, 2010a).

Evaluation of treatment outcome is central to the assessment of effectiveness of tuberculosis control programmes (Berhe *et al.*, 2012; Lisha *et al.*, 2012). Treatment outcomes of patients are classified as successful (cure or treatment completed) or poor (default, treatment failure or death) as defined by the WHO (2010b). Success rate as high as 94.2% was recorded in a study by Lisha et al.

in southwestern India (2012), while 58.9% was recorded in Ghana (Burton *et al.*, 2011). (2012), (2011) and (Arentz *et al.*, 2011) reported poor outcome rates between 10.8% and 24.1%. Default rate ranged between 20% and 44.2% as reported by previous studies (Salami and Oluboyo, 2003; Daniel *et al.*, 2006; Belo *et al.*, 2011; Pefura *et al.*, 2011; Saka *et al.*, 2011; Pefura *et al.*, 2012). Treatment default or poor adherence to treatment means patient remain infectious for longer, are more likely to relapse, could result in treatment failure as well as foster emergence of drug resistant tuberculosis (Erhabor *et al.*, 2000; Salami and Oluboyo, 2003; Muture *et al.*, 2011; Saka *et al.*, 2011). It has also been shown that defaulters have the tendency to default again (Saka *et al.*, 2011). Certain factors have been found in previous studies to be contributory to poor treatment outcomes among TB patients. HIV co-infection is a very important factor for default and mortality (Arentz *et al.*, 2011; Belo *et al.*, 2011; Burton *et al.*, 2011; Muture *et al.*, 2011; Basset *et al.*, 2012; Nansera *et al.*, 2012) in tuberculosis patients. Delay in tuberculosis diagnosis has been identified as a risk factor for failure to comply with treatment (Rojas *et al.*, 2010), while non-consent for HIV testing was also identified as a factor for poor treatment outcome (Pefura *et al.*, 2012). This study was performed to analyze the trend of default rate and other treatment outcome of patients with DOTS therapy in terms of relapse, treatment failure and death and to identify associated factors for unsuccessful/poor treatment outcomes at a tertiary hospital in southwestern Nigeria. Identification of factors responsible for unsuccessful treatment outcomes is necessary to carry out appropriate interventions to reduce poor treatment outcomes in Nigeria.

MATERIALS AND METHODS

Medical records of patients who were registered and managed in the Directly Observed Treatment Short-course (DOTS) Clinic in the Department of Community Medicine, Federal Medical Center, Ido-Ekiti, South-western Nigeria in 2010 and 2011 were retrospectively reviewed. Basic demographic information, follow-up/new case, diagnosis, and classification of diagnosis (pulmonary smear positive and smear negative/extra-pulmonary), case detection by sputum smear, consent for HIV screening, HIV status, and outcome of treatment of the 167 patients enrolled between January 2010 and December 2011 were analyzed. All the patients were expected to have completed their treatment by the last quarter of year 2012.

The patients are mostly referred from the Outpatients clinic, ART Care and Support Unit and the Hospital wards. Records of patients with incomplete data were excluded from the study. Tuberculosis treatment outcomes were assessed according to WHO guidelines (2010b). SPSS version 20.0 was used to analyses the data. A trend analysis of clinical and outcome data as well as their association with treatment outcomes were done. Yates Chi-square test was used to estimate the difference between patients with good treatment outcomes compared with those with poor treatment outcomes. A p-value of less than 0.05 was considered as statistically significant.

RESULTS

A little over half of the patients studied in 2010 (51.3%) had smear positive tuberculosis while this percentage dropped to 42.5% in 2011. There is an increase in the number and percentage of tuberculosis patients that consented to HIV test (table 1) and a lesser number of patients defaulted treatment in 2011 (19.2%) as against 30.8% of patients that defaulted in 2008.

Of the documented factors that affected treatment outcomes of the tuberculosis patients seen in the two years, consent for HIV testing had an overall statistically significant positive outcome. While 39.9% of patients that consented to HIV testing had poor tuberculosis treatment outcome, 93.3% of those that did not consent had poor outcome. The effects of HIV status of the patients was also statistically significant as shown in table 2 with 57% of those who were HIV negative having good treatment outcome. HIV co-infection is the only factor showing statistical significance out of the four factors affecting mortality in this study. Some 30.9% of patients with HIV co-infection died while 7.8% of those without HIV co-infection died (p=0.000). There was no significant association between site of tuberculosis and proportion of deaths in tuberculosis patients. There was also no statistically significant association between sputum smear and mortality although 22% of smear positive patients died while 11.2% of smear negative patients died.

DISCUSSION

A total of 198 patients were reviewed in the 2 year period (78 and 120 patients were reviewed in 2010 and 2011 respectively). The review of the tuberculosis patients' records showed 51% of those seen in 2010 were smear positive and 42.5% were smear positive in 2011. These were low compared to the findings in a similar study done in Cameroon by Pefura *et al.* (2012) which gave a smear positive value of 73.8%. Further studies need to be carried out to determine the smear positivity rates in other centres in Southwest Nigeria and also evaluate the quality of screening test used.

Out of all the Patients in this study, 46.2% and 49.2% had good treatment in 2010 and 2011 respectively. These are lower than percentages recorded for previous similar studies. The study done in Ile-Ife, Nigeria between 1996 and 1997 recorded a cure rate of 73% (Erhabor *et al.*, 2000) while studies done in Ghana by Burton *et al.* (2011), in Ethiopia by Berhe *et al.* (2012) and in Colombia by Rojas *et al.* (2010) yielded cure rates of 58.9%, 89.2% and 86% respectively.

There was an improvement in default rate between 2010 (30.8%) and 2011 (19.2%). This is still in contrast to the 6.5% default rate in the Ghanaian study (Burton *et al.*, 2011) but compares with studies in Brazil (Belo *et al.*, 2011) and Sagamu, Nigeria (Daniel *et al.*, 2006) in which 20.9% and

23% of tuberculosis patients defaulted. HIV coinfection with tuberculosis occurred in 17.6 % of patients in 2011. This is a reduction and a relative improvement compared to a value of 20% in 2010 in this study. It is also an improvement when compared to results of 37% in a study carried out in Kenya between 2008 and 2009 (Arentz *et al*., 2011). Also, there is an increase in the number and percentage of patients that consented to HIV test from 84.6% in 2010 to 97.5% in 2011. This may be due to advocacy and spread of awareness about the disease as well as the importance of its association with HIV/AIDS. Negative smear result and HIV co-infection have been associated with poor outcomes in tuberculosis treatment (Arentz *et al.*, 2011) and HIV testing should be encouraged in all tuberculosis cases so as to ensure a focused wholistic treatment approach.

Considering the deaths due to tuberculosis, 44.2% of the tuberculosis patients died in 2011 as against 11.5% mortality recorded in 2010. Although this value is not consistent with the result of a similar study carried out in India by Lisha *et al*. (2012) between 2002 and 2004 in which the mortality was 5.4% and another in Europe by Faustini *et al.* (2005) in which the mortality was 6.8%, it is in line with the result of a 2009 study by Burton *et al.* (2011) in which 32.1% of tuberculosis patients seen in a teaching hospital in Ghana died. The increase in mortality in this study from 2010 to 2011 might have been due to the possible effects of drug resistant tuberculosis. The disparity between the mortality rates recorded in the African and European studies may also be due to the relatively higher prevalence of tuberculosis in Africa compared to Europe. It is recommended that resistant rates should be calculated as this will help focus on the proper treatment options for patients with multi drug resistant tuberculosis thereby reducing mortality. More should also be done to minimize default rates (which was found to be high in this study) and improve HIV testing among tuberculosis patients so as to set a template for good treatment outcome.

REFERENCES

Arentz, M., M. Narita, L. Sangaré, J. Kah, D. Low, K. Mandaliya, E. Amukoye, J. Sitienei and J. Walson, 2011. Impact of smear microscopy results and observed therapy on tuberculosis treatment in mombasa, kenya. Int J Tuberc Lung Dis. 2011, 15(12): 1656-1663.

Basset, I., S. Chetty, B. Wang, M. Mazibuko, J. Giddy, Z. Lu, R. Walensky, K. Freedberg and E. Losina, 2012. Loss to follow-up and mortality among hiv-infected people co-infected with tb at art initiation in durban, south africa. J Acquir Immune DeficSyndr. 2012, 59(1): 25-30.

Belo, M., R. Luiz, E. Teixeira, C. Hanson and A. Trajman, 2011. Tuberculosis treatment outcomes and socio-economic status: A prospective study in duque de caxias, brazil. Int J Tuberc Lung Dis. 2011, 15(7): 978-981.

Berhe, G., F. Enquselassie and A. Aseffa, 2012. Treatment outcomes of smear-positive pulmonary tuberculosis patients in tigray region, northern ethiopia. BMC Public Health. 2012, 12: 537.

Burton, N., A. Forson, M. Lurie, S. Kudzawu, E. Kwarteng and A. Kwara, 2011. Factors associated with mortality and default among patients with tuberculosis attending a teaching hospital clinic in accra, ghana. Trans R Soc Trop Med Hyg. 2011, 105(12): 675-682.

Daniel, O., O. Oladapo and O. Alausa, 2006. Default from tuberculosis treatment programme in sagamu, nigeria. Niger J. Med., 15(1): 63-67.

Erhabor, G., O. Adewole, A. Adisa and O. Olajolo, 2003. Directly observed short course therapy for tuberculosis – a preliminary report of a three-year experience in a teaching hospital. J Natl Med Assoc. 2003, 95(11): 1082-1088.

Erhabor, G., H. Aghanwa, M. Yusuph, R. Adebayo, F. Arogundade and A. Omidiora, 2000. Factors influencing compliance in patients with tuberculosis on directly observed therapy at ile-ife, nigeria. East Afr Med J. 2000, 77(5): 235-239.

Faustini, A., A. Hall and C. Perucci, 2005. Tuberculosis treatment outcomes in europe: A systematic review. European Respiratory Journal 2005, 26(3): 503-510.

Lisha, P., P. James and C. Ravindran, 2012. Morbidity and mortality at five years after initiating category i treatment among patients with new sputum smear positive pulmonary tuberculosis. Indian J. Tuberc. 2012, 59(2): 83-91.

Muture, B., M. Keraka, P. Kimuu, E. Kabiru, V. Ombeka and F. Oguya, 2011. Factors associated with default from treatment among tuberculosis patients in nairobi province, kenya: A case control study. BMC Public Health. 2011, 11(696).

Nansera, D., F. Bajunirwe, P. Elyanu, C. Asiimwe, G. Amanyire and F. Graziano, 2012. Mortality and loss to follow-up among tuberculosis and hiv co-infected patients in rural southwestern uganda. Int J Tuberc Lung Dis. 2012.

Pefura, Y., EW., , A. Kengne and C. Kuaban, 2011. Incidence, time and determinants of tuberculosis treatment default in yaounde, cameroon: A retrospective hospital register-based cohort study. BMJ Open. 2011, 1(2).

Pefura, Y., EW., , C. Kuaban and A. Kengne, 2012. Hiv testing, hiv status and outcomes of treatment for tuberculosis in a major diagnosis and treatment centre in younde, cameroon: A retrospective cohort study. BMC Infect Dis. 2012, 12(1): 190.

Rojas, C., S. Villegas, H. Piñeros, E. Chamorro, C. Durán, E. Hernández, R. Pacheco and B. Ferro, 2010. Clinical, epidemiological and microbiological characteristics of a cohort of pulmonary tuberculosis patients in cali, colombia. Biomedica. 2010, 30(4): 482-491.

Saka, D., M. Aydoğdu, H. Calisir, F. Cimen and M. Oğretensoy, 2011. The treatment results of retreatment pulmonary tuberculosis patients in our clinic. TuberkToraks. 2011, 59(2): 111-119.

Salami, A. and P. Oluboyo, 2003. Management outcome of pulmonary tuberculosis: A nine year review in ilorin. West Afr J Med. 2003, 22(2): 114-119.

Woldeyohannes, D., N. Kebede, W. Erku and Z. Tadesse, 2011. Ten years' experience of directly observed treatment short-couse (dots) therapy for tuberculosis in addis ababa, ethiopia. Ethiop Med J. 2011, 49(3): 221-229.

Table-1. Outcomes and HIV Co-infection with Tuberculosis

Year	2010		2011	
Variable	Frequency(%)	N	Frequency(%)	N
Smear Positive Tuberculosis	40 (51.3)	78	51 (42.5)	120
Co – Infection with HIV with smear +ve TB	8 (20.0)	40	9(17.6)	51
Extra Pulmonary Tuberculosis	10 (12.8)	78	15 (12.5)	120
Consented for HIV Test	66 (84.6)	78	117 (97.5)	120
Consented for HIV Test among smear +ve TB	33 (82.5)	40	49 (96.7)	51
Percentage under 10 years with bacteriological confirmed TB	3 (100)	3	3 (60.0)	5
Defaulted Treatment	24 (30.8)	78	23 (19.2)	120
Poor Treatment Outcome(default, dead, treatment failure)	36 (46.2)	78	51 (42.5)	120
Good Treatment (cured, completed treatment)	36 (46.2)	78	59 (49.2)	120
Transferred Out	6 (7.7)	78	10 (8.3)	120
Default of those with Poor Treatment Outcome	24 (66.7)	36	23 (44.2)	52
Died of those with Poor Treatment Outcome	9 (25.0)	36	23(44.2)	52
Failure Treatment of those with Poor Treatment Outcome	3 (8.3)	36	5 (9.6)	52
Mortality Outcome	9 (11.5)	78	23 (44.2)	120
Non HIV Associated TB	52 (66.7)	78	76 (63.3)	120

Table-2. Factors affecting treatment outcomes of Tuberculosis whether Good or Poor

			Good (%)	Poor (%)	Transfer (%)	Total
1.	Smear at diagnosis	+	40 (44.0)	44 (48.4)	7 (7.7)	91
		-	55 (51.4)	43 (40.2)	9 (8.4)	107
		$X^2 = 1.346$ df = 2 p = 0.510				
2.	Consent for HIV	Yes	95 (51.9)	73 (39.9)	15 (8.2)	183
		No	0 (0.0)	14 (93.3)	1 (6.7)	15
		$X^2 = 16.839$ df = 2 p = 0.000				
3.	HIV Status	+	22 (40.0)	29 (52.7)	4 (7.3)	55
		-	73 (57.0)	44	11 (8.6)	128
		No consent	0 (0.0)		1 (6.7)	15

				(34.4) 14 (93.3)		
		$X^2 = 22.196$ df = 4 p = 0.000				
4.	Site of Tuberculosis	Pulmonary	87 (50.3)	71 (41.0)	15 (8.7)	173
		Extra Pulmonary	8 (32.0)	16 (64.0)	1 (4.0)	25
		$X^2 = 4.733$ df = 2 p = 0.094				

Table-3. Factors affecting mortality and other outcomes of Tuberculosis

			Mortality (%)	Other outcomes (%)	Total
1.	Sputum Smear Status	+	20 (22.0)	71 (78.0)	91
		-	12 (11.2)	95 (88.8)	107
		Yate's $X^2 = 3.448$ df = 1 p = 0.063			
2.	HIV Co – Infection	+	17 (30.9)	38 (69.1)	55
		-	10 (7.8)	118 (92.2)	128
		No Consent	5 (33.3)	10 (66.7)	15
		$X^2 = 18.678$ df = 2 p = 0.000			
3.	Site of Tuberculosis	Pulmonary	27 (15.6)	146 (84.4)	173
		Extra Pulmonary	5 (20.0)	20 (80.0)	25
		Yate's $X^2 = 0.071$ df = 1 p = 0.577			
4.	Consent of HIV	Yes	27 (14.8)	156 (85.2)	183
		No	5 (33.3)	10 (66.7)	15
		Yate's $X^2 = 2.294$ df = 1 p = 0.130			

Figure-1. Multiple Bar Chart showing trend of Smear positive TB, Extra pulmonary TB and percentage of under 10 years with bacteriological TB between 2010 and 2011

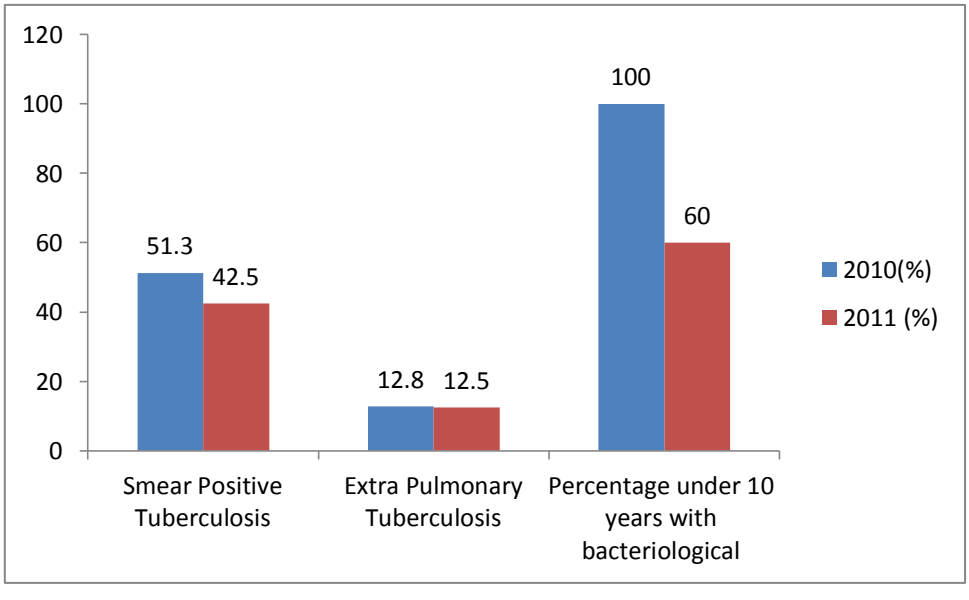

Figure-2. Trend of Co – infection of HIV with TB, Non HIV Associated TB, Consented for HIV Test and Consented for HIV test among smear positive TB between 2010 and 2011

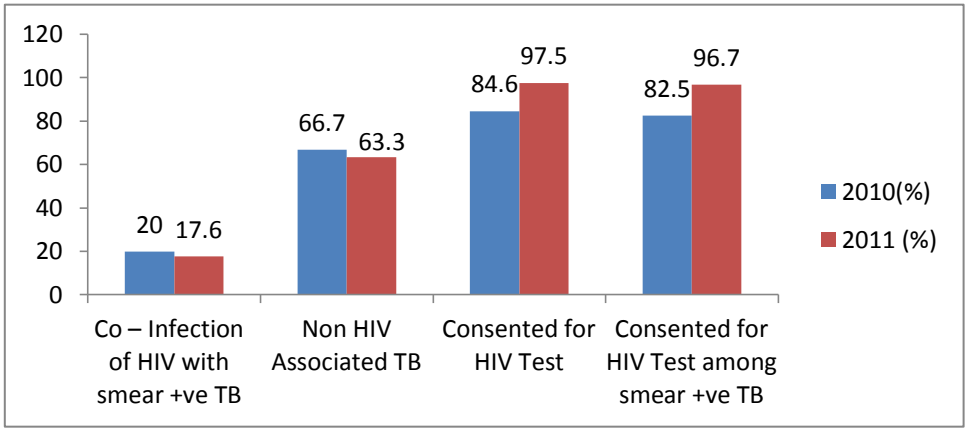

Figure-3. Multiple Bar Chart showing default, treatment failure and mortality

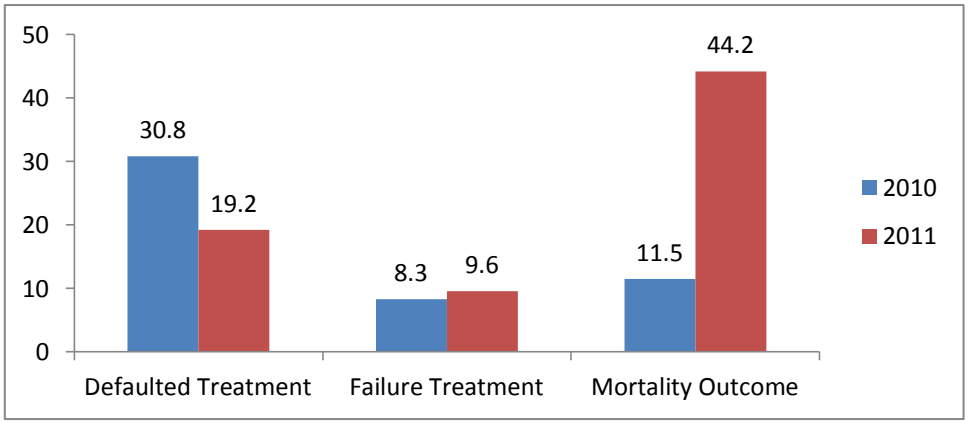

Figure-4. Multiple Bar Chart showing trend of treatment outcomes between 2010 and 2011