International Review of Social Sciences and Humanities
Vol. 4, No. 2 (2013), pp. 209-218
www.irssh.com
ISSN 2248-9010 (Online), ISSN 2250-0715 (Print)

Factors Affecting Treatment Outcomes of Tuberculosis in a Tertiary Health Center in Southwestern Nigeria

Oluwole Adeyemi Babatunde
(Corresponding Author)
Department of Community Medicine, Federal Medical Center,
P.O. Box 201, Ido-Ekiti, Ekiti state, Nigeria. Postal Zip Code 23437
E-mail: wolleking@yahoo.com

Olusegun Elijah Elegbede
Department of Community Medicine, Federal Medical Center,
Ido-Ekiti, Nigeria
E-mail: seguneleg bedeng@yahoo.com

Majekodunmi Ayodele
Department of Behavioral Sciences, Federal Medical Center,
Ido-Ekiti, Nigeria
E-mail: majekayod@yahoo.com

Joseph Olusesan Fadare
Department of Internal Medicine, Federal Medical Center,
Ido-Ekiti, Nigeria
E-mail: jofadare@gmail.com

Ayodeji Olusola Isinjaye
Department of Community Medicine, Federal Medical Center,
Ido-Ekiti, Nigeria
E-mail: ayoisinkaye@yahoo.com

Demilade Olusola Ibirongbe
Department of Community Medicine, Federal Medical Center,
Ido-Ekiti, Nigeria
E-mail: talk2demilade@yahoo.com

Juwon Akinyandenu
Department of Community Medicine, Federal Medical Center,
Ido-Ekiti, Nigeria
E-mail: jayone4real@yahoo.com

(Received: 26-4-12 / Accepted: 19-10-12)

Abstract

Tuberculosis kills nearly 3 million persons per year worldwide. This study investigated treatment outcomes of Tuberculosis (TB) among TB cases and the factors affecting them. A descriptive cross-sectional study was carried out using records of all patients seen 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 Epi-info computer software. Frequency tables and cross tabulations were generated and a p-value of less than 0.05 was statistically significant. Successful treatment outcomes were seen in 46.1% of cases. All cases under 10 years of age had bacteriological confirmed TB. Of those with poor treatment outcome, 66.7%, 25.0%, and 8.3% were defaulters, died and treatment failure respectively. Factors that affected the TB outcome negatively were smear positive status at diagnosis, failure to give consent for HIV test, HIV co-infection, and Extra-pulmonary TB. Just about half of the cases had successful treatment outcomes. HIV co-infection and lack of consent for HIV testing are major factors determining negative treatment outcome. It is recommended that patients with TB be counseled on the need for HIV testing, linking the HIV positive patients to support groups and commencing anti-retroviral medications.

Keywords: Defaulter, HIV, HIV-TB Co-infection, Treatment failure, Tuberculosis.

Introduction

Tuberculosis (TB) is a chronic Mycobacterial infection present in all parts of the world. In most developing countries, it remains one of the major health problems, with the incidence increasing rather than decreasing.[1] Tuberculosis primarily affects the lungs in more than 80% of the cases leading to pulmonary tuberculosis. Extra-pulmonary tuberculosis occurs in less than 20% of cases and affects various organs such as the lymph nodes, bones and joints, the urogenital tract, the meninges, the intestine, peritoneum, etc.[1]

Tuberculosis kills nearly 3 million persons per year worldwide[2] and is still one of the leading causes of deaths worldwide accounting for 2.5% of the global burden of disease and 25% of all avoidable deaths in developing countries.[3] It remains a major cause of mortality despite availability of effective treatment.[4] Also, drug-resistant tuberculosis is on the increase in many countries of the world.[5] TB was declared by the World Health Organization (WHO) to be a global emergency in April 1993. And as part of global efforts to control TB, the Millennium Development Goal (MDG) 6, Target 8 is to “Halt and begin to reverse the incidence of TB by 2015.”

Tuberculosis affects both adults and children. In a 2-year study carried out in Australia, a total of 23 children under 10 years of age (male n=13, female n=10) had bacteriological confirmed tuberculosis, including 3 children with TB meningitis.[6] Tuberculosis has also been identified with HIV/AIDS, and B has been recognized as one of the most frequent opportunistic infections in persons with HIV infection. Similarly, the incidence of tuberculosis has increased in places where tuberculosis and HIV infection are highly prevalent.[1] The co-existence of HIV infection and tuberculosis has been hailed as one of the most serious threats to human health since the Black Death and has been labeled ‘the cursed duet’.[5] In a study done in Durban, South Africa, it was found that HIV/TB co-infected individuals are more likely to die or be lost to follow up within 12 months of ART clinic entry.[7]

The WHO recommended strategy for global tuberculosis control is a short-course clinically administered treatment.[8] The DOTS (Directly Observed Treatment Short course) strategy requires that the patient be treated for eight months which includes a two months intensive phase in which treatment is given under strict supervision by a trained observer, and a six months continuation phase. This is to ensure compliance as well as significantly reduce the rates of relapse and drug resistance. DOTS has been found to be an effective means of administering anti-TB drugs.[9]

Treatment outcomes are classified as successful (cure/completed) or unsuccessful (default/failure/death). Successful treatment of tuberculosis (TB) involves taking anti-tuberculosis drugs for at least six months. In a study carried out in Brazil, the overall treatment default ratio was 20.9% and the unsuccessful outcome rate was 24.1%.[10] Poor adherences to treatment means patient remain infectious for longer, are more likely to relapse or succumb to tuberculosis and could result in treatment failure as well as foster emergence of drug resistant tuberculosis.[11, 12]

Tuberculosis treatment default or antituberculosis treatment discontinuation was defined as any interruption of treatment for at least two months following treatment initiation.[13] Defaulters are hard to cure because they have the tendency to default again and they have higher resistance rates.[14] A failure case is one that continues to be sputum positive after five months of adequate chemotherapy. A relapse is a patient who was once declared cured but later again became sputum positive.[1]

In a study done in Sagamu, Nigeria, defaulting rate was found to be highest during the continuation phase of the treatment.[15] Another study carried out in Yaounde Cameroon shows 337 (20%) defaulted from treatment, 86 (5.1%) died, treatment failed in 6 (0.4%) and 104 (6.2%) were transferred; while treatment was successfully completed in 1154 (68.4%) patients.[13] While in a similar study in Accra, Ghana 599 (58.9%) patients completed therapy and/or were cured, 192 (32.1%) died, and 39 (6.5%) defaulted.[4]

Factors identified for mortality included unknown sputum smear status[4], HIV co-infection[4,16,7], initial negative AFB smear[16], disseminated TB[4], TB meningitis[4], not having a treatment supporter[4], and low body weight[4]. While factors associated with treatment default included HIV co-infection[4,11,7], not having a treatment supporter[4], delay in diagnosis[8], inadequate knowledge on TB[11], herbal medication use[11], low income[11], alcohol abuse[11,17], previous default[11,17], male gender[11,17,15], old age[17], unmarried status[17], unemployment[17], and cigarette smoking[17]. Delay in tuberculosis diagnosis has also been identified as a risk factor for treatment compliance failure.[8]

This study investigated various treatment outcomes of TB among TB cases and the factors affecting it in a tertiary health centre in Southwestern Nigeria.

Methodology

This is a cross sectional study using records of Tuberculosis patients managed in the Directly Observed Treatment Short-course (DOTS) clinic of the Department of Community Medicine, Federal Medical Center (FMC) Ido-Ekiti, South Western Nigeria. F M C Ido-Ekiti is one of the Federal tertiary health institutions in Nigeria. The DOTS Clinic started in 2003, with full support of the National Tuberculosis and Leprosy Control Programme (NTBLCP) and the German Tuberculosis and Leprosy Relief Association (GLRA).

The primary data used for this study was obtained from hospital record of patients seen and commenced on DOTS in the DOTS clinic from 1st Jan 2010 to 31st Dec 2010. The patients were referred from the hospital outpatient clinic, wards and ART Care and Support Unit. In this descriptive study, records of all the 78 patients diagnosed and registered as cases of Tuberculosis in year 2010 were retrieved and entered into a proforma. Records of patients with incomplete data were excluded from the study. All the patients were expected to have completed their treatment by the last quarter of year 2011.

Data collected from the register were entered into EPI-Info software using a proforma which contained date, socio-demographic information, follow-up/new case, diagnosis, and classification of diagnosis (pulmonary/extra-pulmonary), sputum status, consent for HIV screening, HIV status, and treatment outcome. Frequency tables and charts were generated. Cross tabulation of variables was done. Chi-square test was used to determine the relationship between variables. A p-value of less than 0.05 was considered as statistically significant.

Results

There were 78 cases of Tuberculosis seen during the period under review. Most of the cases (87.2%) had pulmonary tuberculosis, while 12.8% had extra-pulmonary tuberculosis. Forty patients (51.3%) had sputum positive tuberculosis. Among sputum positive patients, 33 (82.5%) consented for HIV testing, and 8 out of these (20.0%) had HIV/AIDS co-infection.
Males accounted for 59.0% of the patients while 41.0% were females. There were two peaks in the age distribution of the patients, 21-30 years (30.8%) and >50yrs (28.2%). Of the non-HIV associated TB cases 50% were within 26-50 years of age, while 28.8% were greater than 50 years of age, and 21.2% were less than 25 year of age. There were 3 patients under 10 years of age with bacteriological confirmed TB.

The mortality rate among all the patients with TB was 11.5%, while default rate was 30.8%. Good treatment outcome was seen in 46.2% of cases; while poor treatment outcome was seen in 46.2% of cases and 7.7% were transferred out. Among the patients with poor treatment outcome, 24 (66.7%) defaulted treatment, 9 (25.0%) died, and 3 (8.3%) were treatment failures. Good outcome was recorded more in patients who were smear negative at diagnosis (50.0%) than in those who were smear positive at diagnosis (45.0%), although this was not statistically significant.

Non consent for HIV testing was found to be associated with poor treatment outcome. Poor treatment outcome was seen in 83.3% of patients who did not give consent for HIV testing while 37.9% had poor treatment outcome of those who consented for HIV testing. This was statistically significant. Among patients who did not give consent for HIV testing, only one (8.3%) had good outcome.

Good treatment outcome was recorded more in patients with negative HIV status (57.7%) than among patients who were HIV positive (42.9%). This was significant. Also poor outcome was recorded more in patients with extra-pulmonary TB (60.0%) than among patients with pulmonary TB (42.6%).

Sputum status, HIV co-infection and site of the TB were found to be significant for mortality. Mortality was higher among smear positive patient (20%) than among smear negative patients (2.6%). Mortality was also found to be higher among patients with HIV co-infection (35.7%) than among patients with negative HIV status (1.9%). The site of the tuberculosis was also found to be significant, as 30% mortality was recorded in patients with extra-pulmonary TB compared with patients with Pulmonary TB (8.8%). Lack of consent for HIV testing was found to be associated with defaulting treatment. Of those who defaulted from treatment, 66.7% were patients who did not give consent for HIV testing compared with 24.2% of patients who gave consent for HIV testing.

There was a statistically significant relationship between age of patient and sputum status. Sputum smear of patients with non-HIV associated TB was positive in those less than 25yrs (81.8%) while a larger proportion of those above 50 years were negative (86.7%)

Discussion

Successful treatment outcomes were seen in 36 (46.1%) while unsuccessful treatment outcomes were seen in 42 (53.9%) of the cases of Tuberculosis managed in year 2010. The overall mortality rate was 11.5%, while default rate was 30.8%. In the light of the Millennium Development Goals which aims at reversing the trend of Tuberculosis, default rate of 30.8% is not a good indicator of progress towards the achievement of the MDGs.

In a similar study of factors affecting treatment outcomes of Tuberculosis carried out in Yaounde Cameroon, where socio-demographic and clinical predictors of treatment discontinuation were investigated, 337 (20%) defaulted from treatment, 86 (5.1%) died, treatment failed in 6 (0.4%) and 104 (6.2%) were transferred; while treatment was successfully completed in 1154 (68.4%) patients[13].

The mortality rate that was found in this study is about double of that which was found in the Cameroon study. This disparity might be because of high HIV co-infection and lack of consent for HIV testing which appeared to have increased the mortality and default rate. However in Accra Ghana, 192 (32.1%) died, while 39 (6.5%) defaulted.[4] The much higher proportion of mortality found in Ghana as compared to the finding from this study might be because of high HIV co-infection, disseminated or Meningeal disease and lack of treatment supporters which the Ghanaian study found as significant factors affecting mortality.

In another study in Brazil, Tuberculosis treatment outcomes and socio-economic status was studied, the overall treatment default rate was 20.9% and the unsuccessful outcome rate was 24.1% [10]. When compared with findings from this study where the unsuccessful treatment outcome was 53%, the relatively lower unsuccessful treatment outcome found in Brazil might be because of better socio-economic conditions in Brazil as compared with Nigeria with poorer socioeconomic indices.

In a study done in Durban, South Africa, HIV/TB co-infected individuals are more likely to die or be lost to follow up within 12 months of ART clinic[7]. This is in line with the findings in this study where 35.7% of patients who had HIV/TB co-infection died. In this study, HIV/TB co-infection was a major factor affecting mortality of Tuberculosis patients with a statistical significance of p-0.0006. All cases under 10 years of age in this study had bacteriological confirmed TB. This is similar to a study carried out in Australia, where a total of 23 children under 10 years (male n=13, female n=10) had bacteriological confirmed tuberculosis, including 3 children with TB meningitis.[6]

The result from this study shows that mortality was 8 (20%) for sputum smear positive (+) status, compared to mortality of 1 (2.6%) for sputum smear negative (-) status. Sputum smear positive (+) is the presence of at least one acid fast bacilli (AFB+) in at least one sputum sample in countries with external quality assurance system.[18] The association between smear positivity and mortality was statistically significant with a p-value of 0.04. Mortality was found in 8 (66.7%) of patients with Tuberculosis that did not consent to HIV testing compared to 16 (24%) in those that consented to testing for HIV, this shows that lack of consent for HIV test is a predictor of mortality in patients with Tuberculosis.

The result showed that the proportion that had extra-pulmonary TB was 12.8%. This is at variance with the finding in Ethiopia where extra-pulmonary TB was found in 33% of respondents. A factor that could have been responsible for this difference is the fact that the Ethiopian study was a ten-year review of TB cases which perhaps covered a period when control has not been instituted. Obionu however noted that extra-pulmonary tuberculosis occurs in less than 20% of cases of TB and affects various organs such as the lymph nodes, bones and joints, the urogenital tract, the meninges, the intestine, peritoneum, etc.[1]

The result also showed that the site of Tuberculosis affects mortality with mortality in 8.8% of patients with pulmonary Tuberculosis compared with mortality of 30.0% in patients with extra-pulmonary Tuberculosis. This is however not statistically significant, hence the site of TB does not necessarily have an implication on the mortality outcome.

In conclusion, factors that affect the Tuberculosis outcome negatively were smear positive (+) status at diagnosis, failure to give consent for HIV test and HIV co-infection with statistically significant p-values. It is recommended that patients with TB be counseled on the need for HIV testing which may help identify those with HIV/AIDS co-infection, as well as linking the HIV positive patients to support groups and commencing anti-retroviral medications early which has the potential to reduce mortality.

Tables and Figures:

Table 1: Outcomes and HIV co-infection with Tuberculosis

VARIABLE	FREQUENCY (%)	N
Smear positive Tuberculosis	40 (51.3)	78
Co-infection with HIV with smear +ve TB	8 (20.0)	40
Extra Pulmonary Tuberculosis	10 (12.8)	78
Consented for HIV Test	66 (84.6)	78
Consented for HIV Test among smear +ve TB	33 (82.5)	40
Percentage under 10years with bacteriological confirmed TB	3 (100)	3
Defaulted treatment	24 (30.8)	78
Poor treatment outcome (default, dead, treatment failure)	36 (46.2)	78
Good treatment outcome (cured, treatment complete)	36 (46.2)	78
Transferred out	6 (7.7)	78
Default of those with poor treatment outcome	24 (66.7)	36
Died of those with poor treatment outcome	9 (25.0)	36
Failure treatment of those with poor treatment outcome	3 (8.3)	36
Mortality outcome	9 (11.5)	78
Non HIV Associated TB	52 (66.7)	78

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

		Good (%)	Poor (%)	Transfer (%)	Total
1. Smear at diagnosis	+	18 (45.0)	19 (47.5)	3 (7.5)	40 (100.0)
	_	19 (50.0)	16 (42.1)	3 (7.9)	38 (100.0)
		X^2 - 0.233 df - 2 p - 0.89			
2. Consent for HIV testing	Yes	36 (54.5)	25 (37.9)	5 (7.6)	66 (100.0)
	No	1 (8.3)	10 (83.3)	1 (8.3)	12 (100.0)
		X^2 - 9.25 df - 2 p - 0.0098			
3. HIV Status	+	6 (42.9)	7 (50.0)	1 (7.1)	14 (100.0)
	_	30 (57.7)	18 (34.6)	4 (7.7)	52 (100.0)
	No consent	1 (8.3)	10 (83.3)	1 (8.3)	12 (100.0)
		X^2 - 10.32 df - 4 p - 0.0349			
4. Site of Tuberculosis	Pulmonary	33 (48.5)	29 (42.6)	6 (8.8)	68 (100.0)
	Extra Pulmonary	4 (40.0)	6 (60.0)	0 (0.0)	10 (100.0)
		X^2 - 1.6 df-2 p - 0.45			

Table 3: Factors affecting mortality and defaulter outcome of Tuberculosis

		Mortality (%)	**Other outcomes (%)**	**Total (%)**
1. Sputum smear status	+	8 (20.0)	32 (80.0)	40 (100.0)
	_	1 (2.6)	37 (97.4)	38 (100.0)

		Yates X^2 – 4.18 p - 0.04		
2. HIV co-infection	+	5 (35.7)	9 (64.3)	14 (100.0)
	_	1 (1.9)	51 (98.1)	52 (100.0)
	No consent	3 (25.0)	9 (75.0)	12 (100.0)
		X^2 - 14.86 df - 2 p - 0.0006		
3. Site of Tuberculosis	Pulmonary	6 (8.8)	62 (91.2)	68 (100.0)
	Extra-pulmomary	3 (30.0)	7 (70.0)	10 (100.0)
		Yates X^2 – 2.04 p - 0.15		
		Defaulters (%)	Other outcomes (%)	Total (%)
4. Consent for HIV	Yes	16 (24.2)	50 (75.8)	66 (100.0)
	No	8 (66.7)	4 (33.3)	12 (100.0)
		Yates X^2 – 6.70 p - 0.0096		

Figure 1: Sex distribution of TB patients

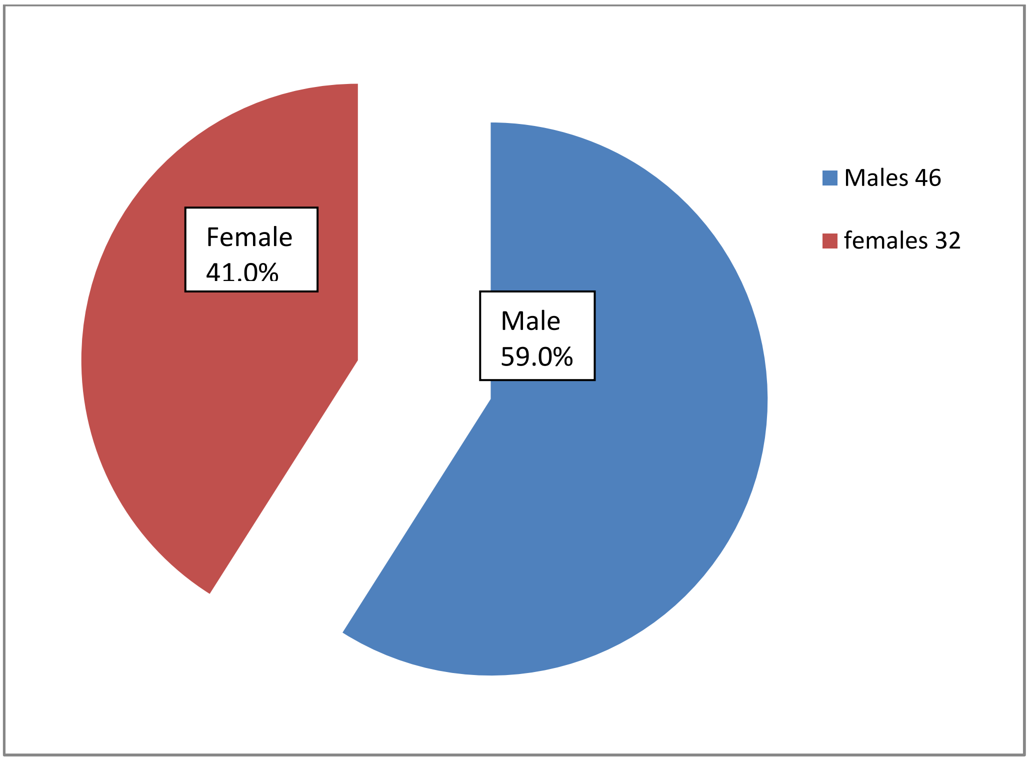
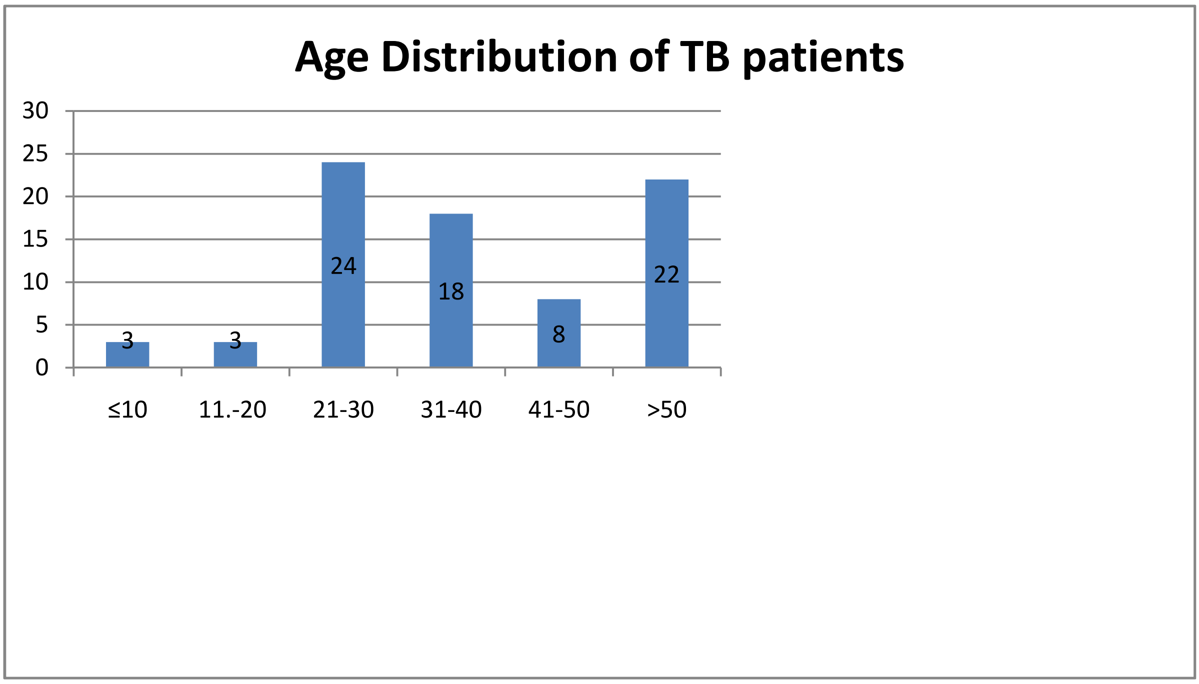


Figure 2: Age Distribution of TB patients



References

[1] C.N. Obionu, In: *Primary Health Care for Developing Countries (2nd ed)*, (2007), Evanseenio Printing & Publishing, Enugu.

[2] L. Murray, B.W. Ian and R. Supraj, In: *Oxford Handbook of Clinical Medicine (6th ed)*, (2005), Oxford University Press, New York.

[3] D. Woldeyohannes, N. Kebede, W. Erku and Z. Tadesse, Ten years experience of directly observed treatment short-couse (dots) therapy for tuberculosis in Addis Ababa, Ethiopia, *Ethiop Med J.*, 49(3) (2011), 221-9.

[4] N.T. Burton, A. Forson, M.N. Lurie, S. Kudzawu, E. Kwarteng and A. Kwara, Factors associated with mortality and default among patients with tuberculosis attending a teaching hospital clinic in Accra, Ghana, *Trans R Soc Trop Med Hyg.*, 105(12) (2011), 675-82, Epub 2011 Sept 13.

[5] A.O. Lucas and H.M. Gilles, In: *Short Textbook of Public Health Medicine for the Tropics (4th ed)*, (2003), Oxford University Press, New York.

[6] R. Lumb, I. Bastion, R. Carter, P. Jelfs, T. Keehner and A. Sievers, Tuberculosis in Australia: Bacteriologically confirmed cases and drug resistance, 2008 and 2009, A report of the Australian Mycobacterium Reference Laboratory Network, *Commun Dis Intell.*, 35(2) (2011), 154-61.

[7] I.V. Basset, S. Chetty, B. Wang, M. Mazibuko, J. Giddy, Z. Lu, R.P. Walensky, K.A. Freedberg and E. Losina, Loss to follow-up and mortality among HIV-infected people co-infected with TB at ART initiation in Durban, South Africa, *J. Acquir Immune Defic Syndr.*, 59(1) (2012), 25-30.

[8] C.M. Rojas, S.L. Villegas, H.M. Piňeros, E.M. Chamorro, C.E. Durán, E.L. Hernández, R. Pacheco and B.E. Ferro, Clinical, epidemiological and microbiological characteristics of a cohort of pulmonary tuberculosis patients in Cali, Colombia, *Biomedica*, 30(4) (2010), 482-91.

[9] G.E. Erhabor, O. Adewole, A.O. Adisa and O.A. Olajolo, Directly observed short course therapy for tuberculosis: A preliminary report of a three-year experience in a teaching hospital, *J Natl Med Assoc.*, 95(11) (2003), 1082-8.

[10] M.T. Belo, R.R. Luiz, E.G. Teixeira, C. Hanson and A. Trajman, Tuberculosis treatment outcomes and socio-economic status: a prospective study in Duque de Caxias, Brazil, *Int J Tuberc Lung Dis.*, 15(7) (2011), 978-81.

[11] B.M. Muture, M.N. Keraka, P.K. Kimuu, E.W. Kabiru, V.O. Ombeka and F. Oguya, Factors associated with default from treatment among tuberculosis patients in Nairobi province, Kenya: A case control study, *BMC Public Health*, 11(2011), 696.

[12] G.E. Erhabor, H.S. Aghanwa, M. Yusuph, R.A. Adebayo, F.A. Arogundade and A. Omidiora, Factors influencing compliance in patients with tuberculosis on directly observed therapy at Ile-Ife, Nigeria, *East Afr Med J.*, 77(5) (2000), 235-9.

[13] E.W.P. Yone, A.P. Kengne and C. Kuaban, Incidence, time and determinants of tuberculosis treatment default in Yaounde, Cameroon: A retrospective hospital register-based cohort study, *BMJ Open*, 1(2) (2011), e000289.

[14] D. Saka, M. Aydoğdu, H.C. Calisir, F. Cimen and M. Oğretensoy, The treatment results of retreatment pulmonary tuberculosis patients in our clinic, *Tuberk Toraks*, 59(2) (2011), 111-9.

[15] O.J. Daniel, O.T. Oladapo and O.K. Alausa, Default from tuberculosis treatment programme in Sagamu, Nigeria, *Niger J. Med.*, 15(1) (2006), 63-7.

[16] M. Arentz, M. Narita, L. Sangaré, J.F. Kah, D. Low, K. Mandaliya, E. Amukoye, J. Sitienei and J.L. Walson, Impact of smear microscopy results and observed therapy on tuberculosis treatment in Mombasa, Kenya, *Int J Tuberc Lung Dis.*, 15(12) (2011), 1656-63.

[17] A.K. Salami and P.O. Oluboyo, Management outcome of pulmonary tuberculosis: A nine year review in Ilorin, *West Afr J Med.*, 22(2) (2003), 114-9.

[18] H.L. Reider and A. Van deun, TB diagnostics and laboratory strengthening- WHO policy, Last accessed on 18/12/2011, Available at http://www.who.int/tb/laboratory/policy.