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FACTORS ASSOCIATED WITH TB/HIV CO-INFECTION AMONG DRUG SENSITIVE TUBERCULOSIS PATIENTS MANAGED IN A SECONDARY HEALTH FACILITY IN LAGOS, NIGERIA

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Abstract

Background: This study assessed factors associated with TB/HIV co-infection among TB patients managed in a secondary health facility in Lagos Nigeria.
Materials and Methods: A retrospective review of treatment cards of patients seen at a secondary referral hospital between January 1 2014 and December 31 2014 was conducted. Treatment outcomes and factors associated with TB/HIV co-infection were assessed.
Results: Of the 334 records of patients reviewed, the proportion of patients with TB/HIV co-infection was 21.6%. The odds of having TB/HIV co-infection was 2.7 times higher among patients above 40 years than patients less than 25 years (AOR 2.7 95% CI 1.1 – 6.5, p =0.030). In addition, the odds of having TB/HIV co-infection was 3.3 higher among extra-pulmonary TB cases (AOR 3.3; 95% CI 1.2 – 9.5; p = 0.026) and 2.1 times higher among retreated patients (AOR 2.1; 95% CI 1.1 – 3.9; p = 0.017) than pulmonary TB and new patients respectively. The chance of having TB/HIV co-infection was 2.7-fold more in patients with poor treatment outcomes than patients with treatment success (AOR 2.7; 95%CI 1.3 – 5.4; p =0.006).
Conclusion: TB/HIV co-infection rate was high in the study area. There is need to put measures in place to improve treatment outcomes of TB/HIV co-infected patients.

Key Words: TB, HIV, co-infection, Nigeria

Introduction

Tuberculosis (TB) and human immune deficiency virus (HIV) co-infection is a serious public health challenge because of associated mortality globally (WHO, 2015). Of the nine million incident TB cases reported in 2013, 13% had HIV and the African Region had the highest TB/HIV co-infection rate at 34% (WHO, 2014). Globally, people living with HIV (PLWHA) are about 30 times more likely to develop TB than HIV-negative individuals (WHO, 2014). In 2013, an excess of 25% deaths among TB patients were due to HIV co-infection, the majority of which were from the African Region (WHO, 2014). HIV was partly responsible for the failure to meet TB control targets especially in countries with high prevalence of HIV (FMOH Ethiopia, 2009).

TB and HIV constitute lethal combination of diseases that significantly impacts the public health system individually and collectively. HIV infection weakens the immune system which in turn increases the risk of TB infection. It is the most powerful risk factor for reactivation of latent TB infection to active disease (FMOH Nigeria, 2013). On the other hand, the course of HIV infection is usually accelerated by TB infection which may be the first opportunistic infection and a leading cause of death in individuals infected with HIV (WHO, 2012).

TB burden in Nigeria (318 per 100,000) is one of the highest in the world (WHO, 2014) and according to the National Agency for the Control of AIDS (NACA) the prevalence of HIV in Nigeria is 3.4% as at 2012 (NACA, 2012). However, the proportion of patients with TB/HIV co-infection in Nigeria is 19.1% (NTBLCP, 2014). Several studies from Nigeria and other high TB burden countries have shown that TB/HIV co-infected patients have poorer treatment outcomes (Daniel and Alausa, 2006; Ofoegbu and Odume, 2015; Tweya et al. 2013; Payam et al, 2012). This study assessed factors associated with TB/HIV co-infection among TB patients managed at a secondary health facility in Lagos Nigeria.

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Materials and Methods

Study design

A retrospective review of treatment cards of patients seen at a secondary referral hospital between January 1 2014 and December 31 2014 was conducted.

Study background

This study was carried out at the directly observed treatment short course (DOTS) clinic of Mainland hospital in Lagos Nigeria. Lagos state is located in the South-western part of Nigeria and has a population of about 21 million people. There are 20 Local Government Areas (LGAs) and 37 Local Council Development Areas in the state. Mainland hospital is a secondary health facility established in 1930 as a sanatorium to serve as an infectious disease hospital. The name was changed to Mainland Hospital in 2003. Presently, the hospital serve as a referral center for the management of infectious diseases like TB, multi drug resistant TB, HIV/AIDS, Cholera, Ebola virus disease and Lassa fever.

Coordination of TB control in Lagos State

The DOTS management of TB commenced in Lagos State in 2003 and is coordinated by the Lagos State TB and Leprosy Control Programme (LSTBLCP). By 2014 there were 317 (214 public and 103 private) DOTS facilities in the state. TB drugs supplied by the National TB and Leprosy Control Programme (NTBLCP) were given to patients at no cost. In addition, patients were not charged for sputum microscopy, Gene Xpert and HIV tests. TB treatment duration was six months divided into 2 months' intensive and 4 months' continuation phase. Rifampicin, Isoniazid, Pyrazinamide and Ethambutol as fixed dose combination were given during the intensive phase while during the continuation phase, Rifampicin and Isonizid as fixed dose combination were given. HIV test was conducted for all presumptive TB clients. Determine (determine HIV-1/2 Alere Determine™, Japan 2012) and Uni-Gold™ (Trinity Biotech PLC, Wicklow, Ireland 2013) were used in parallel algorithm. However, STAT-PAK® was used as tie breaker when there was discordant result.

Definition of outcome variable

a) Cured: This was the proportion of smear positive patients that complete treatment and had at least two negative smears with an interval of at least one month, one of which should be obtained at the end of treatment.
b). Treatment completed: This was the proportion of patients that completed treatment but sputum examination results are not available or smear negative patients that completed treatment.
c) Died: The proportion of patients that died from any cause before completion of treatment.
d). Default: This was the proportion of patients that did not take drugs for at least two consecutive months.
e). Treatment failure: This was the proportion of patients who were sputum smear positive at five months or more after the commencement of treatment, or patients who interrupted treatment for more than 2 months after completing one month of chemotherapy afterwards returned to treatment and were found to be smear positive
f). Treatment success: This is the sum of the cases that were cured and that completed treatment.

Data analysis

Data was analyzed using Statistical Package for Social Sciences (SPSS) IBM version 19. Percentages, mean and standard deviation of numerical variables were determined. Chi squared test and Fisher's exact test were used to compare categorical variables as the case may be. Crude and adjusted odds ratio of associated factors were determined. Confidence interval was set at 95% for all statistical test. Records with complete data were included for analysis.

Ethical issues

Data for this study were retrieved from secondary data routinely collected at Mainland Hospital. Permission for data collection was obtained from the LTBLCP and the management of Mainland Hospital.

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Results

Of the 334 records of patients reviewed, the majority 224 (67.1%) were between 20 – 39 years. Mean age was 32.2±11.0 years. The majority were males (75.4%) while 236 (70.7%) were new cases. The proportion of TB/HIV co-infected patients was 21.6% and of the 312 (93.4%) with pulmonary TB, 216 (69.2%) were smear positive as shown in Table 1.

Table 1: Demographic and tuberculosis profile of patients

Variable	Frequency (n= 334)	%
Age group (years)		
<20	30	9.0
20 – 39	224	67.1
40 – 59	68	20.4
≥ 60	12	3.6
Mean±SD	32.3±11.0	
Gender		
Male	252	75.4
Female	82	24.5
Type of TB		
Pulmonary	312	93.4
Extra-pulmonary	22	6.6
Treatment category		
New	236	70.7
Retreatment	98	29.3
Had treatment supporter		
Yes	208	62.3
No	126	37.7
HIV status		
Negative	262	78.4
Positive	72	21.6
Smear result	**n = 312**	**%**
Positive	216	69.2
Negative	96	30.8

The odds of having TB/HIV co-infection was 2.7 times higher among patients above 40 years patients less than 25 years (AOR 2.7 95% CI 1.1 – 6.5, p =0.030). In addition, the odds of having TB/HIV co-infection was 3.3 higer among extra-pulmonary TB cases (AOP 3.3; 95% CI 1.2 – 9.5; p = 0.026) and 2.1 times higher among patients (AOR 2.1; 95% CI 1.1 – 3.9; p = 0.017) than pulmonary TB and new patients respectively. The chance of having TB/HIV co-infection was 2.7-fold more in those with poor treatment outcomes than those with treatment success (AOR 2.7; 95%CI 1.3 – 5.4; p =0.006) (Table 2).

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Table 2: Regression analysis of associated factors of TB/HIV co-infection

Variable	TB/HIV n = 72 (%)	TB n = 262 (%)	COR (95%CI), p	AOR (95%CI), p
Age group				
< 25	10 (12.2)	72 (87.8)	1	
25 - 39	40 (23.3)	132 (76.7)	2.2 (1.0 – 5.0), 0.038	2.1 (0.9 – 4.6), 0.072
≥ 40	22 (27.5)	58 (72.5)	2.7 (1.1 – 6.8), 0.014	2.7 (1.1 – 6.5), 0.030
Gender				
Female	20 (24.4)	62 (75.6)	1.2 (0.7 – 2.3), 0.473	1.6 (0.9 – 3.1), 0.135
Male	52 (20.6)	200 (79.4)	1	
Type of TB				
Extra-pulmonary	10 (45.5)	12 (54.5)	3.4 (1.3 – 8.8), 0.0124	3.3 (1.2 – 9.5), 0.026
Pulmonary	62 (19.9)	250 (80.1)	1	
Type of patient				
Retreated	26 (26.5)	72 (73.5)	1.5 (0.8 – 2.7), 0.154	2.1 (1.1 – 3.9), 0.017
New	46 (19.5)	190 (80.5)	1	
Treatment outcome				
No treatment success	18 (39.1)	28 (60.9)	2.8 (1.4 – 5.7), 0.002	2.7 (1.3 – 5.4), 0.006
Treatment success	54 (18.8)	234 (81.2)	1	

NB: COR = Crude odds ratio, AOR = Adjusted odds ratio

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Table 3 shows that a significantly higher proportion of TB patients were cured than TB/HIV co-infected patients (37.4% vs 22.2%; p =0.016) however, more TB/HIV co-infected patients died than TB patients (11.1% vs 2.3%; p 0.003)

Table 3: Treatment outcome in TB/HIV co- infected and TB patients

Variable	TB/HIV n = 72 (%)	TB n = 262 (%)	p
Cured	16 (22.2)	98 (37.4)	0.016
Treatment completed	38 (52.8)	136 (51.9)	0.896
Defaulted	10 (13.9)	22 (8.4)	0.161
Died	8 (11.1)	6 (2.3)	0.003*
Treatment success	54 (75.0)	234 (89.3)	0.002

NB: *= Fishers exact test

Discussion

Proportion of TB patients tested for HIV

This present study showed that all the patients treated for TB had HIV counseling and testing (HCT). This finding is higher than the Lagos state (92.4%) and national (92%) figures (NTBLCP, 2014; Daniel et al, 2015). This may be because the study setting was a referral site for TB, HIV and MDR-TB cases in Lagos state and as such it was standard practice at the hospital for all presumptive TB patients to undergo HIV test.

TB/HIV co-infection rate

In sub-Saharan Africa, the risk of developing TB is high. This is partly due to high HIV prevalence. In 2014, an estimated 41% of African TB cases were HIV co-infected (WHO, 2014). In this study, 21.6% had TB/HIV co-infection comparable to Lagos state (23%) (Daniel et al, 2015), national (19%) figures (NTBLCP, 2014) and a study from Eastern Nigeria (Njepuome and Odume, 2009) but higher than what was reported in a study from a south-western state in Nigeria (Oladimeji et al, 2013). However southern Africa countries like Malawi and South Africa with high HIV prevalence reported TB/HIV co-infection rate between 56% – 62% (WHO, 2014; Tweya, 2013). The prevalence of TB/HIV co-infection was 43% in Africa (USAID, 2013) and between 50 – 80% in parts of sub-Saharan Africa in 2012 (Luetkemeyer and Daley, 2013). Our finding may be a reflection of the decline in the prevalence of HIV prevalence in the country (NACA, 2012) as earlier studies showed that TB/HIV prevalence in Nigeria was between 28% and 43% (Daniel and Alausa, 2006; Oshi et al 2014; Njepuome and Odume, 2009; Ifebunandu et al, 2012).

Factors associated with TB/HIV co-infection

This study showed that TB/HIV co-infection was associated with age group 40 years and above. This is contrary to what was reported in similar studies from Nigeria and Ethiopia, where TB/HIV co- infection was associated with lower age groups (Ofoegbu and Odume 2015; Ige and Oladokun, 2011; Njepuome and Odume 2009; Mekonnen et al, 2015). TB and HIV is known to affect people in the reproductive age groups (WHO, 2014). The reason for the findings in this study is not known, it may be due to sampling variation.

TB/HIV co-infected patients were three times likely to have extra-pulmonary TB (EPTB) than pulmonary TB in this study. Extra-pulmonary TB has been associated with HIV infection (Sterling et al, 2001) because there is increased susceptibility for reactivation and dissemination of TB in these patients (Sterling et al 2001). HIV infection is recognized as the commonest risk factor associated with EPTB and the odds of having EPTB are increased in advanced HIV infection (Jones et al 1993). Our finding differs from what was obtained in a study from Ethiopia which showed that TB/HIV co-infection was associated with pulmonary TB (Mekonnen et al, 2015).

Treatments of recurrent TB are often associated with drug resistance and low cure rates (Unis et al, 2014). TB recurrence depend largely on TB incidence and HIV prevalence (Glynn et al, 2010) and in areas with high TB incidence,

previously treated TB patients and those with HIV are at higher risk of developing TB from re-infection than the general population and non-HIV people respectively (Millet et al, 2013; Marx et al, 2012). In this study, TB/HIV co-infected patients were 2 times likely to be retreated cases than TB patients similar to what was reported from San Francisco (Payam et al, 2007). A study which used molecular genotyping to distinguish relapse from re-infection showed that HIV patients were five times likely to have TB relapse than non-HIV patients (Nettles et al, 2004).

In this present study, TB /HIV co-infection was significantly associated with poor treatment outcome (AOR: 2.7; 95 % CI 1.3–5.41; p = 0.006). This is incongruent to a study from India that reported comparable treatment outcomes between TB/HIV co-infected patients and TB patients (Suresh et al, 2013). TB/HIV co-infection has been shown to be associated with poorer TB treatment outcomes than TB infection (Daniel and Alausa, 2006; Ofoegbu and Odume, 2015; Tweya et al, 2013; Oshi et al, 2014; Mekonnen et al 2015). Decreased intestinal absorption of anti-tuberculous drugs, TB and HIV drug interaction, pill burden, HIV related stigma, lack of disclosure of HIV status and cost of attending two clinics especially when both clinics are not located within the same hospital have been adduced as possible reasons for poor treatment outcome among TB/HIV co-infected patients (Daniel and Alausa, 2006; Peloquin et al, 1993; Gebremariam et al, 2010; Tadesse et al, 2013; Wares et al, 2003). Severe immune suppression which may increase difficulty of diagnosis and hence delay in treatment initiation may often result in higher mortality among TB/HIV co-infected patients (De Cock et al, 1992).

Limitation

Some of the records were incomplete and, therefore, were not included for data analyses.

Conclusion

TB/HIV co-infection rate was high in the study area and it was associated with older age group, retreatment cases, extrapulmonary TB and poor treatment outcomes. The LSTBLCP need to put measures in place that will improve the treatment outcomes of TB/HIV co-infected patients.

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