Original Research Article

Prevalence of HIV infection among tuberculosis patients in a teaching hospital in south-west Nigeria: A four-year retrospective study

Kolade O. Ranti [a], Atilola O. Glory [a,*], Babalola T. Victoria [b], Komolafe O. Isaac [a]

[a] Department of Biological Sciences/Microbiology Unit College of Natural Sciences, Redeemer's University, PMB 210 Ede, Osun State, Nigeria
[b] Department of Community Medicine and Primary Care, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria

A R T I C L E   I N F O

A B S T R A C T

Introduction: According to the World Health Organization, Nigeria remains one of the worst affected countries with HIV and *Mycobacterium tuberculosis* infections in the world. Of a critical concern is the emerging threat of co-infection at an unprecedented proportion in the country. In south-west Nigeria, few studies have assessed the prevalence of HIV infection among TB patients. Findings aimed at estimating the prevalence of HIV co-infection among TB patients enrolled in a teaching hospital in Ogun State, south-west Nigeria between 2008 and 2011 are presented in this study.
Materials and methods: This is a retrospective study of 386 TB patients admitted between January 2008 and 2011 to Olabisi Onabanjo University Teaching Hospital, Ogun State, Nigeria of which 206 (53%) were males and 180 (47%) were females. Descriptive statistics, chi-square test and logistic regression were utilized in the analysis of the data.
Results: An overall HIV prevalence of 29.27% (95% CI: 24.78–34.09) was found. Female TB patients had higher odds of HIV infection (OR 1.91, 95% CI: 1.03–3.55) while patients with the highest education had the least odds of HIV infection [OR 0.08, 95% CI: 0.01–0.56].
Conclusion: Evidence of a rising tide of HIV infection in TB patients was found, in particular among single middle-aged women with low education. Further research also needs to be conducted to provide more insight into the epidemiology of co-infection in order to better address the dual burden of HIV and TB among tuberculosis patients in Nigeria.

1. Introduction

Human immunodeficiency virus (HIV) and *Mycobacterium tuberculosis* infections remain the leading causes of morbidity and mortality from infectious disease in both children and adults in sub-Saharan Africa [1]. Most recent global estimates of incident cases of HIV and active TB infections stood at 2.5 million and 9 million respectively with 13% of TB cases co-infected with HIV [2,3]. The mechanisms of susceptibility of tuberculosis patients to co-infection with HIV remain largely unknown and promoted by a complex set of socio-behavioral and environmental factors [4]. The overall aim of this study was to determine the prevalence of HIV among TB patients at the Olabisi Onabanjo University Teaching Hospital, Ogun State, Nigeria between the period of 2008 and 2011.

Nigeria has recorded an overall steady decline in the proportion of people infected with HIV from a peak of 5.8% in 2001 to 3.2% in 2013. The country remains the second worst HIV affected country in the world with a total estimated burden of 3.4 million people living with HIV/AIDS [3]. There has been a rapidly growing trend in the epidemiologic synergy forged between the two diseases particularly in sub-Saharan Africa as one potentiates the other and complicate other unrelated infectious diseases among vulnerable groups. While the literature is sparse with regard to attempt to define the prevalence magnitude of the rising co-epidemic and its socio-economic dimension in south-west Nigeria, a few studies have signaled the potential of the two diseases to erode past public health gains as well as slowing down effectiveness of current control efforts in Nigeria [4,5].

Furthermore, TB is known to be preventable and curable; however, it remains the most common cause of AIDS-related deaths in Nigeria and sub-Saharan Africa. Conversely, among individuals with latent TB within a population, HIV remains the most significant cause of reactivation of tuberculosis, and rapid progression to death if not diagnosed early or effectively treated [6]. However, being a disease that thrives in poor living conditions, TB ensures that effective control can be attained by proper

* Corresponding author.
E-mail address: globadox626@yahoo.com (A.O. Glory).

implementation of sanitary and hygienic practices which include avoidance of overcrowding (especially in households, schools, correctional and health facilities) and the minimization of air pollution [7,8]. Evidence of high burden TB reactivation has also been found among immigrants in countries with low incidence of tuberculosis as reported by Lillebaek and are colleagues [9].

In Nigeria, few studies have assessed presentation and treatment outcome of HIV and TB co-infection both in children and adult TB patient populations. A five-year retrospective assessment conducted by Daniel and his Colleagues in Ogun State reported a 10.5% period prevalence of HIV among 76 children with TB [10]. In a separate study conducted by Umeh and others among patients who presented with respiratory symptoms in a referral chest clinic, the risk of co-infection was about three times higher among HIV positives than TB positives [11]. The study also reported a 12.8% prevalence of HIV/TB co-infection [11]. Certain socio-cultural factors have been shown to exacerbate co-infection in Nigeria which include gender inequality and sexual violence entrenched in diverse Afro-cultural norms particularly among rural and urban slum dwellers in sub-Saharan Africa [12,13].

However, while ample studies exist with respect to the prevalence of HIV in TB patients across different parts of Nigeria, a dearth of studies exist with regard to the sero-prevalence of HIV co-infection among TB patients on DOTS therapy in south-west Nigeria. In the present study findings from a four-year retrospective assessment of HIV prevalence among TB patients in a teaching hospital in south-west Nigeria are presented.

2. Materials and methods

2.1. Study design, setting and target population

This study was a retrospective descriptive and analytic assessment of TB patient records. A retrospective review of all TB patient records enrolled at the Olabisi Onabanjo University Teaching Hospital (OOUTH) in Ogun State from 2008 to 2011 was conducted. The primary study was conducted at the department of Virology and Directly Observed Treatment Short Course (DOTS) Clinic, at the OOUTH Sagamu, Ogun State in south-west, Nigeria. The town (Sagamu) is an urban area located about 50 km from the metropolitan city of Lagos with an estimated population of 253 421 as of 2006 census.

2.2. TB test and HIV diagnosis in enrolled patients

TB case diagnosis was conducted using acid-fast bacilli (AFB) test, Mantoux test and chest X-ray radiography among patients attending OOUTH, Sagamu, between 2008 and 2011. This period was selected due to completeness of the record. This was followed by clinical diagnosis of HIV infection and subsequent confirmation using Determine® and Starpac® Diagnostic kits.

2.3. Data collection, management and statistical analysis

Two independent study personnel conducted a record review on 386 TB patient registers. Information on demographic parameters of patients including age, gender, marital status, occupation and level of education were retrieved from each patient's record. Extracted data was captured in excel spreadsheets. As part of the data management procedure, cleaning, coding and recoding of extracted data were carried out. Descriptive analysis was carried out to assess the distribution of TB and HIV co-infection with respect to socio-demographic variables using frequencies and proportions. Significant difference between patients who had only TB and patients with TB-HIV co-infection with respect to socio-demographic variables (at 5% alpha

level) was also reported. Bivariate analysis was then conducted to determine independent associations of socio-demographic variables with the study outcome (TB-HIV co-infection). Bivariate associations significant at 10% alpha level were considered for inclusion using the stepwise-variable selection procedure in the multivariable binary logistic regression model. All statistical significance was reported at 5% alpha level along with the 95% confidence intervals (95% CI) while analyses were implemented in STATA general statistical software package version 12.1.

2.4. Ethical approval

Approval for this study and access to patient records were given by the Ethical Review Committee of Olabisi Onabanjo University Teaching Hospital. In order to forestall a breach in patient confidentiality, record review and data extraction were conducted in a secluded compartment of the health facility.

3. Results

3.1. Descriptive

Of the 386 TB patients that were screened for HIV infection within the study period, an estimated 113 (29.3%) had HIV infection. The highest number of TB cases screened was 139 in 2008 of which 20% had HIV infection while the lowest was 71 in 2011 with 42% sero-positive for HIV infection. A total of 47 (22.8%) male TB patients tested positive to HIV compared to 66 (37%) of females ($p < 0.003$). HIV positivity rate was found to be highest (34% of all HIV infections) in TB patients in the modal middle age group (25–49 years). Results also showed that while

Table 1
Demographic distribution of study population in relation to HIV status.

Variable	Total TB patients enrolled (N = 386)	HIV positive N (%) 113 (29.27)	HIV negative N (%) 273 (70.73)	P-value (<0.05)
Gender				**0.003**
Male	206	47 (22.82)	159 (77.18)	
Female	180	66 (36.67)	114 (63.33)	
Age				**0.043**
0–24	121	26 (21.49)	95 (78.51)	
25–49	226	77 (34.07)	149 (65.93)	
≥50	39	10 (25.64)	29 (74.36)	
Marital status				0.208
Single	138	34 (24.64)	104 (75.36)	
Married	97	23 (23.71)	74 (76.29)	
Widowed/divorced	13	6 (46.15)	7 (53.85)	
Occupation				0.306
Unemployed	5	2 (40)	3 (60.00)	
Student	93	24 (25.81)	69 (74.19)	
Employed	13	2 (15.38)	11 (84.62)	
Business	121	34 (28.10)	87 (71.90)	
Artisan	16	1 (6.25)	15 (93.75)	
Education				**0.010**
None	11	5 (45.45)	6 (54.55)	
Primary	78	27 (34.62)	51 (65.38)	
Secondary	132	29 (21.97)	103 (78.03)	
Higher	27	2 (7.41)	25 (92.59)	
Year of diagnosis				**0.004**
2008	139	28 (20.14)	111 (79.86)	
2009	93	33 (35.48)	60 (64.52)	
2010	83	22 (26.51)	61 (73.49)	
2011	71	30 (42.25)	41 (57.75)	

Significance of bold are P-values of odds ratio estimates that attain statistical significance at 5%. That is the P-value < 5%