



Original Research Article

Prevalence of Tuberculosis in HIV/AIDS Patients in Lafia, Central Nigeria

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ABSTRACT

Keywords

Tuberculosis,
Human
Immuno-
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This study was carried out to determine the prevalence of Tuberculosis (TB) among HIV/AIDS patients in Dalhatu Araf Specialist Hospital Lafia, Central Nigeria. Out of 200 confirmed HIV/AIDS patients examined with Ziehl Neelsen staining method for Acid Fast Bacilli (AFB) in sputum, 69 were positive for AFB showing a prevalence of 34.5%. The majority, 42 (34.4%) were females and 31 (43.7%) of them males belonging to the socio-economically productive age group (31-40). HIV/AIDS patients who are urban dwellers and artisans had the highest TB prevalence of 42.7% and 43.1%. There was no significant association between Socio-demographic and clinical characteristics of TB infected HIV patients at ($P>0.05$). In the study of the most valuable specimen, early morning specimens (Collection samples) were of more diagnostic value than others (collected at the clinic between 9am 12 noon) which gave the highest positive result of 34.5% while samples I and III were 27.0% and 29.0% respectively. The high prevalence of TB among HIV/AIDS patients recorded from this study calls for urgent efforts to check the spread of HIV infections especially in a depressed economy like Nigeria in order to decrease the cases of TB.

Introduction

Tuberculosis (TB) and HIV have been closely linked since the emergence of AIDS. Worldwide, TB is the most common opportunistic infection affecting HIV-seropositive individuals (Pape, 2004) and it remains the most common cause of death in patients with AIDS (Raviglione *et al.*, 1995). Although HIV-related TB is both treatable and preventable, incidence continues to climb in developing nations wherein HIV infection and TB are endemic and resources are limited. About 25% to

65% of patients with HIV/AIDS have tuberculosis of any organ and tuberculosis accounts for about 13% of all HIV related deaths worldwide (Arora and Kumar, 1999; Corbette *et al.*, 2003; Gothi and Joshi, 2004; Sharma *et al.*, 2004; Sharma *et al.*, 2005). While tuberculosis prevalence has declined by more than 20% worldwide, the rates in Africa have tripled since 1990 in countries with high HIV prevalence and are still rising across the continent at 3–4% per year (WHO, 2005).

TB and HIV have become major public health problems in many countries including Nigeria. Of a serious concern is that tuberculosis situation in Nigeria has been worsened by the prevalence of HIV and AIDS (NTBLC, 2006). The prevalence of TB in HIV/AIDS patients is a dual epidemic problem of major concern worldwide more so in Sub-Saharan Africa where there is upsurge of the disease. The World Health Organization (WHO) estimated that 4.4 million people have dual infections with the tubercle bacillus and HIV in the world (Markewitz *et al.*, 1991; WHO, 1992) and almost 80% of these people reside in Africa (Kochl, 1991; WHO, 1992). A person with HIV is up to thirty times more likely to develop active TB than a person with healthy immune system. HIV infection is the highest risk factor so far identified which increase the chance of latent infection with tubercle bacilli progressing to active TB (Selwyn *et al.*, 1980; WHO, 1992; Jawetz *et al.*, 2001) and the risk of active TB in a co-infected person is estimated to be 7-10% per year (Selwyn *et al.*, 1980).

Correct diagnosis and treatment of tuberculosis help to reduce the burden of tuberculosis, provided that infectious cases are detected and treated successfully. However, there are difficulties in achieving the goal of reducing the tuberculosis burden due to a number of challenges, such as difficulties in diagnosing tuberculosis in HIV infected patients due to unusual clinical picture with increase in smear negative acid fast bacilli (AFB negative) pulmonary tuberculosis disease, and atypical findings on chest radiography (Jones *et al.*, 1993; Lucas *et al.*, 1994).

Although numerous data and reports are available from other countries, especially from the developed world, the available data in the Nigerian population is limited and the magnitude and nature of the association also

varies in different locations and ethnic groups. Therefore, knowledge about TB infection among HIV patients might help to understand the spread of the dual infections and to monitor the performances of TB and HIV control activities (WHO 2012). Also, it will be important for public policy and planning and development of clinical services addressing the needs of TB and HIV/AIDS patients. In response to this, the present study was conducted to determine the prevalence of TB in HIV patients in Lafia, Central Nigeria.

Materials and Methods

Study Design and Subjects

This was a cross sectional study conducted in Dalhatu Specialist Hospital (DASH) Lafia, from May to November, 2013. Two hundred (200) Subjects were recruited from the patients attending the HIV care and treatment clinic. Eligible subjects were those aged 10 years and above and who agreed to participate in the study irrespective of their previous tuberculosis status. Patients on tuberculosis treatment were excluded from the study. A complete biodata of each patient was obtained with the aid of a form designed to include age, sex, occupation, marital status, address, and religion. Other information sought and obtained were date and time of specimen collection.

Specimen Collection and Microscopy

The World Health Organization (WHO) procedure for diagnosis of TB at the district level was adopted for this study. The patients submitted three sputum specimens in a plastic leak-proof container over two consecutive days. Spot samples were collected under the TB laboratory supervisor and patients were instructed on how to collect the early morning (collection) samples. Each sample was examined to

ensure that it was sputum and not saliva. The sputum samples were handled in a class I safety cabinet. Sputa accepted were purulent, opaque or greenish in appearance. Samples that were heavily blood stained (clots) were treated with Sodium hypochloride to lyse the clots and concentrated by centrifugation subsequently freeing the bacteria ready for staining. Smears were prepared, fixed and stained by Ziehl-Neelsen staining methods for acid fast bacilli (AFB). The smears were examined for acid fast bacilli under oil immersion (x 100) objective (Moxham and Costello, 1990; WHO, 1998; Salami and Oluboyo, 2002).

Results and Discussion

This study revealed the prevalence of TB in HIV/AIDS patients in DASH, Lafia, central Nigeria. Among 200 confirmed seropositive HIV/AIDS patients examined, 69 were positive for Acid Fast Bacilli (AFB) showing a prevalence rate of 34.5% tuberculosis in HIV/AIDS patients (Table 1). Among the HIV/AIDS patients that were positive for TB, 27(34.6%) were males and 42(34.4%) were females. The occupations of the HIV/AIDS patients with TB are shown in the table 2. A large proportion of the HIV/AIDS patients with TB cases belong to the group of others (such as artisans, business men/women, house wives etc) which constituted 43.1% (28) while civil servants had the least prevalence of 21.7% (5). The majority, 31(43.7), of the TB infected HIV patients belonged to the age group of 31-40 years. Thirty eight (42.7%) of the TB infected HIV patients were from urban areas. There was no significant association between Socio-demographic and clinical characteristics of TB infected HIV patients ($P>0.05$) (Table 1).

The ideal specimens of most diagnostic value were also investigated. Three specimens were collected within 24 hours.

Specimen I (spot specimen) was collected when the patient first reported at the clinic (between 10 am and 12 noon). Specimen II (collection samples) was collected in the morning (between 5 am and 6 am) before eating or brushing of mouth and specimen III (spot sample) was collected at the clinic next day (between 10 am and 12 noon). The early morning specimen (sample II) yielded the highest number of positive results of 69(34.5%) (Table 2), indicating that the early specimen is of most diagnostic value.

TB and HIV co-epidemic is a major public health problem in many parts of the world. This study investigates the prevalence of Tuberculosis among HIV/AIDS patients in DASH, Lafia, Central Nigeria. Out of the 200 HIV/AIDS patients sputa samples examined microscopically with Ziehl-Neelsen staining method, 69 were positive for Acid Fast Bacilli showing a prevalence of 34.5%. The high prevalence of tuberculosis disease among HIV/AIDS patients attending care and treatment in this setting suggests strong association between TB and HIV infection in Central Nigeria. The finding obtained from this study is in consonance with some reports from other parts of this country and beyond. In a study conducted in Plateau State, Nigeria, the prevalence of TB among HIV/AIDS patients was 30.0% (FMH, 2000), 43.2% in Gambia (van der Sande *et al.*, 2004), 42% in Ethiopia (Kassu *et al.*, 2007), 19.3% in Tanzania (Kano *et al.*, 2000), 20% French Guinea (Sobesk *et al.*, 2000], 5.3% in Lagos (Idigbe *et al.*, 1994], 12.6% in Ilonri (Salami and Oluoyo, 2000), 13.9% in Ile-Ife (Olaniran *et al.*, 2011) and 8.5% in rural Tanzania (Bernard *et al.*, 2008). In the sub-Saharan, TB has been diagnosed in 19 – 44% of patients with AIDS (deCock *et al.*, 1992) while that of the united state was put at 46.3% (Onorato and McGray, 1992).

This high prevalence of TB infection among

HIV patients in the study area signifies the urgent need for programmatic revision, strengthening the health system infrastructure, staff capacity building, increasing public awareness, decreasing social and perceived stigma associated with TB and HIV (Deribew *et al.*, 2010) and innovating for patient-friendly and cultural sensitive intervention approaches. Several factors have been suggested to contribute to the variation in the prevalence of TB among HIV patients. Among them are the demographic position of the patient and their socioeconomic status [Harries, 1990]. It has been observed that TB thrives most in communities in which poverty and destitution abound (Onipede *et al.*, 1997). The fact that endogenous reactivation TB occur most commonly among persons with AIDS (Jawetz *et al.*, 2000) also accounts for the high prevalence of TB among HIV/AIDS patients as indicated in this study.

TB and HIV/AIDS can be worsened by each other. TB is the most common opportunistic disease and cause of the death for those infected with HIV (Friedland *et al.*, 2007). Similarly, HIV infection is one of the most important risk factors associated with an increased risk of latent TB infection progressing to active TB disease (Girardi *et al.*, 2000; Meya and McAdam, 2007). So the WHO's Policy on collaborative TB/HIV activities recommends a combination of measures to reduce the burden of TB among HIV-infected individuals (WHO, 2012). These measures include intensified case finding, isoniazid preventive therapy, and infection control and antiretroviral therapy.

Among the 69 HIV/AIDS patients having TB in this study, 27(34.6%) were males and 42(34.4%) were females and these agree with previous reports indicating higher prevalence in females than males (Nwabuko

et al., 2012; Wondimeneh *et al.*, 2012; Tadesse and Tadesse 2013). This is probably related to the high incidence of HIV infection in females which predisposes them to TB as the former is known to activate dormant TB. Women, who have a higher susceptibility to HIV infection, are usually exposed to sexual activities earlier than men mainly for economic reasons (Tadesse and Tadesse, 2013). Furthermore, most African women being subservient subordinated to their husbands have little or no say in issues relating to sexual relationships. The study was done in an area where polygamy and early marriage thrives. It is therefore possible for one male to be the source of infection to several females. Programs on delaying marriage and support women socially and economically are critical (Erulkar *et al.*, 2009; Nwabuko *et al.*, 2012).

The age distribution reveals highest prevalence to be in the age group 31-40yrs (43.7%) followed by 21- 30yrs (28.8%). The higher prevalence of HIV co-infection among TB patients observed among younger age group in this study is consistent with the findings of other studies (Pennap *et al.*, 2010; Kamenju *et al.*, 2011; Olaniran *et al.*, 2011). This age prevalence of TB co-infection among HIV patients probably reflects the age-specific prevalence of HIV in the community. This may be related to patients' being in a sexually active age group in which both TB and HIV prevail most (Tessema *et al.*, 2009; Berhe *et al.*, 2012). The other possible explanation for this may be their increased family, organizational, and societal responsibilities as people in this age group involve themselves in various extraneous daily activities in order to win the socio-economic hardship which increases the frequency of their contact with other patients in their society (Tadesse and Tadesse 2013).

Table.1 Socio-demographic and clinical characteristics of TB infected HIV patients (N=200) in Lafia, Central Nigeria

Characteristic	No. Examined	No.(%) Positive
Sex		
Male	78	27(34.6)
Female	122	42(34.4)
Age Group		
10-20	13	3(23.1)
21-30	59	17(28.8)
31-40	71	31(43.7)
41-50	35	10(28.6)
50>	22	8(36.4)
Residence		
Urban	89	38(42.7)
Sub-urban	65	21(32.3)
Rural	46	10(21.7)
Occupation		
Civil servant	23	5(21.7)
Student	30	9(30)
Farmer	27	8(29.6)
Unemployed	55	19(34.5)
Others	65	28(43.1)
Total	200	69(34.5)

Table.2 Comparison of Various Specimens Collected at Different Periods of the Day

TB Status	Specimen I (Spot sample)(%)	Specimen II (Collection sample)(%)	Specimen III (Spot sample)(%)
Positive	54(27.0)	69(34.5)	58(29.0)
Negative	146(73.0)	131(65.5)	142(71.0)
Total	200(100)	200(100)	200(100)

This can have a serious negative effect on socioeconomic status of a country being the reproductive and economically productive age group.

Results obtained from this study indicated that HIV patients involved in other form of occupations (such as artisans, business men/women, house wives etc) had the highest prevalence of TB (43.1%). This may be accounted for by the wide range of various people/customers they come in contact with in the course of their job which expose them more to infective droplets. Another reason could be the constant traveling away from home by this set of people and can also be due to reactivation of dormant *M. tuberculosis* in their subjects (Olaniran *et al.*, 2011). The low prevalence (21.7%) recorded among civil servants might be attributed to the fact that most of them are educated and enlightened as such they are aware of TB control/prevention techniques. In this study, subjects residing in the urban area had the highest prevalence of 42.7%. This is due to the fact that most urban dwellers engage in promiscuous activities, making them vulnerable to HIV and TB surge. Lafia is densely populated therefore; the spread of *M. tuberculosis* is highly aided.

With respect to the triplicate samples collected per individual patient, only the early morning samples (specimen II) gave the highest positive result of 34.5% while specimen III and I were 29.0% and 27.0% respectively. Specimen II is of most diagnostic value as have been ascertain from previous work that most patients are more productive soon after rising in the morning (Olaniran *et al.*, 2011). The problems that affect the suitability of sputum specimen for proper laboratory diagnosis of TB can be partially solved by procurement of the freshest possible specimen of deep seated cough, prompt

transportation to the laboratory and avoiding long storage in the refrigerators. Provision of instruction sheets for the clinical staff, including nurses, assistants and even patients will assist in the achievement of proper specimen. The laboratory staff should exert strong influence to correct any deviation from proper procedure in procuring optimal specimens. The idea of large repeated or multiple samples should be discouraged as this would lead to wasting of among other things laboratory reagents, personnel's time as well patients resources (Olaniran *et al.*, 2011).

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