

## Prevalence of Smear Positive Tuberculosis among HIV-Positive PTB Suspects at the Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

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**Abstract:** HIV/AIDS-TB co-infection currently forms the main burden of infectious diseases and poses serious diagnostic and therapeutic challenges that have adverse effects on the performance of various HIV and TB intervention programs. The aim of this study was to determine the prevalence of PTB in HIV/AIDS patients in Nnewi, Nigeria. A total of 3303 HIV-positive clients assessing the NnamdiAzikiwe University Teaching Hospital, Nnewi, were screened for TB using the Ziehl Neelsen sputum smear microscopy method and results recorded according to the WHO/IUATLD guidelines. Results: This study recorded a co-infection rate of 6.4%, with higher frequencies of co-infection in the males (3.3%) than in the females (3.1 %) and in the age group of 31-40years (2.6%) than in the other age groups. Conclusion: People living with HIV/AIDS are at increased risk of TB infection and disease and therefore require TB screening as part of their routine follow up investigations using relatively sensitive techniques.

**Key words:** TB • HIV/AIDS • Co-infection

### INTRODUCTION

HIV/AIDS-TB co infection currently forms the main burden of infectious diseases and the emerging impact has become one of the major public health issues of our time worldwide [1]. The implications and challenges of HIV/AIDS-TB co-infection are more than just the presence of two diseases in one particular patient at the same time [2]. HIV and TB have synergistic interactions that speedily accelerate the decline of the host immune system, potentiating the progression of each other and increasing morbidity and mortality. HIV/AIDS and TB join rather in an unholy wed lock to form a lethal combination that subsequently alter all aspects of each other, including the clinical presentations, pathogenesis, laboratory diagnosis, treatments, prevention, epidemiological profile and other issues of socio-

economic and political consequences [3-5]. HIV/TB co-infection poses particular diagnostic and therapeutic challenges and exerts immense pressure on the health care systems in resource poor countries with high TB prevalence [6]. HIV is the main reason for failure to meet TB control targets in high HIV settings [7] while TB has been described as a direct threat to the scale-up of access to HIV treatment [4]. The clinical and laboratory diagnosis of HIV/TB co-infection could be tasking especially in late HIV infection, when CD4+ counts could be less than 200/mm<sup>3</sup> and TB often atypical in presentation making diagnosis more difficult and the condition more deadly [3]. There is lowered cough expectoration with the bacilli load below the 5000 to 10,000 bacilli/ml of sputum needed for smear microscopy to be positive [6], causing many cases to remain undetected. In dually infected persons TB treatment could be complicated by drug interaction with

the highly active antiretroviral therapy (HAART) and paradoxically, patients can develop what is being called Reconstitution Inflammatory Syndrome (RIS), an overreaction of the immune systems that tends to inflame TB [3]. Apart from the increased morbidity and mortality, the social stigma associated with these diseases further compounds the problem [8]. Globally, some 14 million people are estimated to have TB-HIV/AIDS co-infection with the dual epidemics being particularly pervasive in Africa due to the high incidence of HIV in this region [9]. In 2011 alone, there were an estimated 1.1 million HIV-positive new TB cases globally with around 79% of these patients living in sub-Saharan Africa [10]. Currently, there are about 40 million people living with HIV/AIDS (PLWHA) worldwide, with 2.6 million new cases and 1.8 million HIV/AIDS-related deaths occurring annually. TB, a curable and preventable infectious disease, is the most common presenting opportunistic infection among people living with HIV/AIDS including those taking antiretroviral treatment [10]. It is estimated that as many as one-third of these 40 million PLWHA are co infected with tuberculosis which is the leading cause of death among PLWHA, accounting for one in every four HIV related deaths. It is estimated that some 430,000 people died of HIV-associated TB in 2011 [10]. TB enhances the replication of the human immune virus and increases the likelihood of progressing to full blown AIDS by 100 times. TB, in fact, is the main manifestation of AIDS in more than 50% of cases in developing countries. Without proper treatment, 90% of people living with HIV die within months of contracting TB [11]. People living with HIV/AIDS have an exquisite vulnerability to TB. They are 30-50% times more likely to degenerate from latent to clinical active TB than HIV negative people due to HIV-induced immune-suppression [4]. HIV contributes to the re-activation of latent TB and unless treated, to more rapid disease progression of TB and death [2]. People living with HIV/AIDS are also facing emerging threats of drug resistant TB [10]. Nigeria, having the second largest number of people living with HIV-AIDS (4.1 million) in the world, accounts for 10% of the global HIV burden and is ranked 10<sup>th</sup> among the 22 countries with highest TB burden in 2011 [12]. The country recorded an estimated 320,000 prevalent cases of TB in 2010, (equivalence of 199 per 100,000 populations) and a death rate of 5%, a situation attributed to a high prevalence of HIV/AIDS in the country which stands at about 4.6% in the general population [13]. Some 8.0% of people living with HIV/AIDS in Nigeria are also TB positive [14]. With a

population of 162 million, Nigeria is among the five countries with highest TB/ HIV burdens, contributing 60% of the global HIV-associated TB in 2011 [15]. This study was therefore carried out to determine the prevalence of pulmonary tuberculosis (PTB) amongst HIV patients attending the HIV-Care Unit of the Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria, due to paucity of data on the prevalence of TB amongst PLWHA in the state.

**Methodology:** The study population comprised 3303 HIV positive patients who were referred from the HIV-Care Unit (ART) clinic to the TB (DOTS) Laboratory for sputum smear microscopy between January 2010 and December 2013. The ART clinic is a specialist clinic where these patients are seen for treatment and follow-up. The patients have been counseled, screened and confirmed HIV positive using the National Algorithm and were enrolled into the National HIV program. They were clinically suspected of pulmonary tuberculosis by the signs and symptoms of prolonged cough, fever, excessive night sweats, weight loss etc, necessitating requests for routine sputum smear microscopy for mycobacterium tuberculosis (Acid Fast Bacilli).

Sputum sample collection was the conventional on-the-spot, early-morning and on-the-spot (SMS) technique using clean dry transparent wide-mouthed leak proof transparent sputum cups.

Smears of approximately 1x2cm in diameter were made, air-dried, heat-fixed and stained using the standard operating procedure for hot Ziehl Neelsen (ZN) method as adopted by the National Tuberculosis and Leprosy Control Program (NTBLCP). Smears were examined microscopically using x100 objective lens and results recorded according to the International Union Against Tuberculosis and Lung Disease/ World Health Organization (IUATLD/WHO) guidelines as adopted by the NTBLCP [8].

Data on the results of their sputum smear microscopy was collated and analyzed to determine the prevalence of smear positive among the HIV positive patients.

## RESULTS

This study comprised of 3303 HIV sero-positive patients, 1250 (37.8%) males and 2053 (62.2%) females. Out of the 3303 HIV patients that were screened for TB, 212 (6.4%) were AFB positive, 111 (3.3%) males and 101 (3.1%) females.

Table 1: Gender Distribution of HIV/AIDS patients screened for TB

Gender	Number of patients screened	Number of patients co-infected	Prevalence(%)
Male	1250 (37.8%)	111	3.3%
Female	2053(62.2%)	101	3.1%
Total	3303	212	6.4%

Table 2: Prevalence of the HIV/TB Co-infection according to age groups

Age Group(Years)	Number Screened	Number co-infected
= 20	119 (3.6%)	4 (0.1%)
21-30	801 (24.3%)	60 (1.8%)
31-40	1287 (38.9%)	86 (2.6%)
41-50	719 (21.8%)	39 (1.2%)
51-60	294 (8.9%)	18 (0.5%)
>60	83 (2.5%)	5 (0.2%)
Total	3303 (100%)	212 (6.4%)

The prevalence of HIV/TB co-infection according to age groupings showed that the age groups of 21-30 (1.8%), 31-40(2.6%) and 41-50years(1.2%) were most affected, while the age groups of less than 20 years and more than 60 years had the lowest HIV-TB co-infection cases, (0.1%) and (0.2%) respectively.

### DISCUSSION

The relative risk of TB disease in people living with HIV/AIDS has been frequently and variously studied, the results indicating a close relationship between two diseases. The present study showed a HIV/TB co-infection rate of 6.4 %. This could be comparable with two separate studies in the Niger Delta region of Nigeria, 5.91% [17] and 4.39% [18].

However, it was lower than what were obtained in other studies in parts of the country, 10.5% in Kano, northern Nigeria [19], 16.7% in Keffi [20], 19.8% in Benin City [21] and 40% in Ilorin [22]. Observed differences could be due to differences in the study population, time, location, methodology and diagnostic techniques employed. A study in Ile-Ife, Nigeria employed other diagnostic procedures including X-ray and culture which proved more sensitive with 60% positive cases than the microscopic technique (3.9%) [23]. The ZN technique which can detect just fewer than 60% of all new TB infection and between 20 and 30% of HIV/TB infection [13] and was the only technique used in this study. There is a greater proportion of smear negative TB among dually infected individuals with the conventional ZN microscopy technique. More females, 2053 (62.2%) were involved in this study than males, 1250 (37.8%), probably because of

their natural tendency to seek medical attention earlier than the males and more so because females are said to be infected by the AIDS virus more than the males. The sex distribution of the HIV/TB co-infected patients however showed that the males (3.3%) had a greater frequency than the females (3.1%). The gender difference is probably due to the genuine differences in risk, the associated habits of smoking and alcoholism among the males.

### CONCLUSION AND RECOMMENDATION

HIV and TB are intricately linked and the emerging trend presents a dismal picture that requires some more serious attentions. The timely detection and prompt treatment of TB in HIV-TB co infected persons is very important if TB control targets must be achieved. These are key strategies to achieve TB related MDG. All HIV patients should be screened for TB as part of their routine follow up investigations with more sensitive methods like the xpert technology and culture

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