

IJBHS 2007013/3402

Prevalence of smear positive pulmonary tuberculosis in people living with HIV/AIDS in Kano, Nigeria

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(Received March 19, 2007)

ABSTRACT: Background - The World Health Organization (WHO) has recently declared tuberculosis to be a "global health emergency" based on the findings that one-third of the world population has been infected¹. Since the first cases of Acquired Immune Deficiency Syndrome (AIDS) were reported in 1981, infection with Human Immunodeficiency Virus (HIV) has grown to pandemic proportions, resulting in an estimated 65 million infections and 25 million deaths^{2,3}. Unfortunately both synergy each other and enhance the fast progression of one another, hence they are often called "the twin killers".

Methods - Sputum smears were prepared and stained using the Ziehl Neelsen (ZN) staining Technique or AFB staining method while HIV status was ascertained using the current National Algorithm for surveillance as well as laboratory diagnosis of HIV infection and or AIDS.

Results - A total of 113 people living with HIV/AIDS (PLWHA) were tested for sputum AFB. Sixty two (54.9%) were males and 51 (45.1%) females. Eight (7.1%) were found to be smear positive (SS+) and both gender groups had equal number of 4 (3.5%).

Conclusion - TB and HIV co-infection is a great problem that needs to be tackled actively. With the current epidemics of the two infections, there is need not to delay on the sputum smear technique in making final decision in ruling out TB in such patients. Clinical presentations and radiological investigations are two major components to add in such dilemmatic situations to make a final or conclusive diagnosis.

Key Words: Pulmonary tuberculosis; HIV; AIDS; Prevalence; Kano; Nigeria.

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Introduction

The World Health Organization (WHO) has recently declared Tuberculosis to be a "global health emergency" based on the finding that one third of the world population has been infected¹. The WHO estimated that 80% of all tuberculosis cases in the world are concentrated in 22 countries⁴ viz India, China, Indonesia, Bangladesh, Pakistan, Nigeria, the Philippines, South Africa, Ethiopia, Vietnam, Russia, the Democratic Republic of Congo, Brazil, Tanzania, Kenya, Thailand, Myanmar, Afghanistan, Uganda, Peru, Zimbabwe and Cambodia. Since the first cases of Acquired Immune Deficiency Syndrome (AIDS) were reported in 1981, infection with Human Immunodeficiency Virus (HIV) has grown to pandemic proportions, resulting in an estimated 65 million infections and 25 million deaths^{3,4}. During 2005 alone, an estimated 2.8 million persons died from AIDS, 4.1 million were newly infected with HIV, and 38.6 million were living with HIV³. Unfortunately both synergy each other and enhanced the fast progression of one another, hence they are often called "the twin killers". The risk of death in HIV infected patients with tuberculosis is twice compared to HIV infected patients without tuberculosis⁵. Nigeria has the world's fourth largest TB burden with nearly 374,000 estimated new cases annually⁶. Thirty three thousand, seven hundred and fifty five (57%) of the new TB cases were smear positive (SS+) cases. Total number of notified cases of all TB forms increased from 46,473 in 2003 to 59,493 in 2004. At the end of 2005, 66,848 cases of TB had been identified, of which only 52% were SS+⁶.

The public health burden posed by TB is becoming increasingly important as the country's HIV/AIDS burden unfolds. In kano where this prospective study was undertaken, there have been some aspects of TB studies carried out in the past. We have therefore decided to undertake another aspect of PTB work, a study of the prevalence of Pulmonary tuberculosis among people living with HIV infection and AIDS.

Methodology

The study comprised of 113 consecutive HIV positive patients with clinical diagnosis of Pulmonary Tuberculosis who were referred from all clinical Departments within and outside the teaching hospital for AFB sputum smear or Ziehl Neelsen staining technique. The ZN staining technique was used as described by Monica Cheeseborough. Samples were taken as three consecutive overnight sputum specimens or the new recommended WHO standard as on the spot sample, overnight sample and again on the spot sample. In either regimen, 3 sputum specimens were mandatory and the positive sputum result is defined as smear positive (SS+) if a patient has a plus (+) to three pluses (+++) in at least one of the three specimens. The laboratory diagnosis of clinical HIV infection or AIDS were based on the recommended National Algorithm by running parallel Capillus test and Genie 11 kit concomitantly and patients status was considered positive if both tests were reactive. When there is a discordant result, then Determine HIV 1 and 2 kit was used as a tie-breaker. Positive and negative controls were used for quality control and assurance based on Manufacturers' instructions. The study took place from January to December 2005.

Results

A total of 113 people living with HIV/AIDS (PLWHA) were tested for sputum AFB. Sixty two (54.9%) were males and 51 (45.1%) females. Eight (7.1%) were found to be smear positive (SS+) and both gender groups had equal number of 4 (3.5%) smear positive PTB each. No significant difference was found between the males and the females.

Tables 1 shows Gender distribution of the study while table 2 outlined the Age distribution of the screened PLWHAs. Majority of the patients in this study belong the sexually active and reproductive age groups of 25-34 years and 35-44 years respectively.

Table 1: Gender Distribution of the Screened PLWHA

Gender	No Tested for AFB (%)	No +ve for AFB (%)
Males	62 (54.9)	4 (3.5)
Females	51 (45.1)	4 (3.5)
Total	113	8 (7.1)

Table 2: Age distribution of those who were smear positive among the screened PLWHA.

AGE GROUPS	NO TESTED FOR AFB	NO +VE FOR AFB (%)
15-24	9	1 (0.9)
25-34	48	3 (2.7)
35-44	45	3 (2.7)
45-54	7	1 (0.9)
ABOVE 54	1	-
TOTAL	110	8 (7.2)

Discussion

The overall prevalence of 7.1% of smear positive (SS+) PTB among the PLWHA is not surprising as many studies had similar findings of low SS+ rates among PLWHA with TB co-infection. The inextricably linked pathogenesis and epidemiology to TB and HIV are well known. HIV fuels progression to active disease in people infected with TB while individuals co-infected with TB have an annual risk of 5-15% of developing active TB. HIV is not only fueling the TB epidemics but also making TB control more challenging⁷. Most young patients in HIV epidemics would present with classical PTB with cavitations and large number of bacilli in sputum. After few years with increase of symptomatic HIV infections, a higher proportion of cases would have fewer cavitations and low level of bacilli⁸. Although persons in close (i.e., prolonged, frequent, or intense) contact with patients with active TB are at high risk for TB infection. The risk for active TB is increased greatly if the close contact is infected with the human immunodeficiency virus (HIV).⁹

The 7.1% prevalence rate found in this study is quite low compared to results from other centres with high HIV/AIDS and or TB epidemics such as Idigbe E.O. et al (1992)¹⁰ in Lagos, Moses A. E. et al (1990)¹¹ in Maiduguri and WHO (2003)¹². It is important to note that not only the presence of HIV co-infection can contribute to SS- PTB, as the role of the proper, adequate sample collection and procedure or technique used in screening can not be over emphasized. The recommended WHO guidelines that at least 3 samples should be collected and also out of the 3, at least one to be an over night specimen is still adhered to in most developing countries. Yet ZN staining technique remains the most widely and affordable

screening test in such countries. Gothic *et al* in India reported 96.8% of SS+ following a 24hr sputum collection¹³ while Warren *et al* reported 92% SS+ when more than 5 ml of sputum specimen was used for the smear preparation¹⁴. In general the recommended guidelines was to use 5 -10ml of sputum¹⁵. The 24hr sputum collection is not convenient in our settings unless the patient is on admission, while insisting on that may cause a set back and participation from patients due to inconveniency. Another factor which may cause the low prevalence in this study may be associated with the quality and suitability of the collected samples. Hence the need for laboratory technologists and technicians have to educate the patients on good quality sample collection. Sputum AFB smear technique is an extremely simple test to carry out in most laboratories, it requires dedicated effort to obtain accurate results and it remains the only most important test available for TB diagnosis in most developing countries¹⁶.

TB/HIV co-infection is a great problem that needs to be tackled actively. With the current epidemics of the two infections, there is need to quicken the sputum smear technique in making final decision to rule out TB in such patients. Clinical presentations and radiological investigations are two major components to adhere to in such dilemmatic situations. As Nigeria and Kano in particular is posed by the danger and scourge of these two debilitating killers, then there is a need for better incorporation of HIV assessment into contact investigation procedures and improved coordination between local TB and HIV programs to facilitate voluntary HIV counseling, testing, and follow-up for HIV-infected close contacts. Health-care providers and HIV-infected persons should be aware of optimal management of close contacts and of the benefits of prompt and well-supervised DOTS treatment to prevent active TB.

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