

## PREVALENCE OF MYCOBACTERIUM TUBERCULOSIS IN HUMAN IMMUNODEFICIENCY VIRUS PATIENTS AT ART CENTRE AGBOR, NIGERIA

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### ABSTRACT

**Aim:** The prevalence of pulmonary tuberculosis (PTB) in Human immunodeficiency virus (HIV)/Acquired immunodeficiency syndrome (AIDS) patients is a dual epidemic problem of major concern worldwide especially in Africa where there is upsurge of the disease. This study is set to determine the prevalence of PTB among HIV patients.

**Methods:** A total of 489 patients were recruited into the study, 173(35.4%) were males, while 316 (64.6%) were females between January 2012 and December 2013. HIV status and Mycobacterium tuberculosis were determined using WHO systems two and Ziehl Neelsen (ZN) staining technique respectively.

**Results:** Prevalence of 10.6%, 79.6% and 9.8% was obtained for HIV/PTB co infection, HIV and PTB respectively. A prevalence of 5.1% recorded for HIV/PTB co infection is highest among age group 31-45years, followed by 2.7% and 1.6% in the age groups 16-30 and 46-60years respectively. The lowest prevalence of 0.2% each was observed in the age groups 61-75 and 76-90 years.

**Conclusion:** There is need for more advocacy and proper monitoring of infected patients to check the spread of HIV infections especially in a depressed economy like Nigeria in order to further reduce cases of PTB.

**Keywords:** Pulmonary tuberculosis, HIV, Prevalence, Delta State.

### INTRODUCTION

Mycobacterium tuberculosis is an etiologic agent of pulmonary tuberculosis (PTB) with the identifying feature of being Acid Fast (Nwanjo and Oze, 2007). It is a leading health problem worldwide and remains one of the leading causes of death among infectious diseases. The effect of HIV on the global PTB pandemic is very significant. Before HIV infection was discovered, the prevalence of PTB had witnessed a progressive decline. The control measures against tuberculosis such as BCG vaccination, anti- Koch's chemotherapy, and improvement in living conditions with less overcrowding and better nutrition, had succeeded in producing this decline. However, all these gains were reversed by HIV infection (Affusium et al., 2012). Tuberculosis and HIV are the two leading infectious diseases –

associated with mortality worldwide (Friedland et al., 2007). The co infection of PTB and HIV pandemics has resulted in the infection of approximately 12-14 million people worldwide especially in the Sub-Sahara Africa (Friedland et al., 2007). Previous study has shown prevalence rates of 78.3%, 21.7% and 13.3% for HIV, PTB and HIV/PTB co infection respectively in Agbor Central Hospital (Jemikalajah and Okogun, 2009). An individual who is HIV – positive has 10times increased risk of developing TB compared to an HIV – negative person (WHO, 2000), life time risk of 50% for an HIV – positive person and 5-10% for an HIV – negative person (Dosumu, 2006). Due to paucity on the prevalence of PTB among HIV – positive patients in this locality, there is need to further reassess the prevalence rate of PTB among people living with HIV/AIDS

attending the Antiretroviral Therapy (ART) Centre, Agbor Delta State, Nigeria.

## MATERIALS AND METHODS

### Study Population

This retrospective study was carried out at the Antiretroviral Therapy Centre (ART), Central Hospital, Agbor, Delta State, Nigeria between January 2012 and December 2013. The ART Centre caters for referred HIV patients across the State especially in Delta North and some parts of Edo State, Anambra State as well as Bayelsa State. Its coverage serves a population of over Six thousand people. Inclusion criteria are being HIV positive or Mycobacterium tuberculosis (MTB) positive while exclusion criteria are being both HIV and MTB negative. Ethical clearance was obtained from the ethics committee of ART centre Agbor.

### Sample Collection

A total of 489 volunteers were recruited into this study. Pre- test HIV counseling was done for all participants and 3mls of venous blood was collected into EDTA container for HIV testing. Sputum was collected into a wide mouth container on three different occasions for Acid Fast Bacilli (AFB).

### Sample Analysis

Human immunodeficiency virus status was determined using Determine (Abbott Ltd) and Unigold (Trinity Biotech Ltd) as recommended by (WHO) systems two. The Sputa were analyzed for MTB using the Ziehl Neelsen (ZN) staining techniques and quantified according to the National Algorithm.

### Statistical Analysis

All data were analyzed with Statistical Package for Social Sciences (SPSS) version 16.0 for windows using percentages and Chi ( $\chi^2$ ) square. P values < 0.05 are considered statistically significant.

## RESULTS

Out of the 489 patients studied, 173(35.4%) were males, while 316 (64.6%) were females. Prevalence rates of 10.6%, 79.6% and 9.8% was obtained for HIV/PTB co infection, HIV and PTB respectively. Among the patients co infected with HIV/P TB, 31(6.3%) were females while 21(4.3%) were males giving a female to male ratio of 1.0:0.7(Table: 1 and Figure: 1), The prevalence of 5.1% recorded for HIV/P TB co infection was highest among age group 31-45years, followed by 2.7% and 1.6% in the age groups 16-30 and 46-60years respectively. The lowest prevalence rate of 0.2% each was observed in the age groups 61-75 and 76-90 years (Table:2 and Figure: 2)

Table 1: Sex Distribution of HIV and PTB Infection

| Subjects | No (%) Infected males | No (%) Infected females | No (%) Total infected subjects |
|----------|-----------------------|-------------------------|--------------------------------|
| HIV      | 120 (24.5)            | 269 (55.0)              | 389 (79.6)                     |
| PTB      | 32 (6.6)              | 16 (3.3)                | 48 (9.8)                       |
| HIV/PTB  | 21 (4.3)              | 31 (6.3)                | 52 (10.6)                      |
| Total    | 173 (35.4)            | 316 (64.6)              | 489 (100)                      |

Table 2: Age Distribution of HIV, TB and HIV/TB co infection

| Age (Yr) | No of Subjects tested | No (%) Infected HIV | No (%) Infected PTB | No (%) Infected HIV/PTB |
|----------|-----------------------|---------------------|---------------------|-------------------------|
| 0 – 15   | 17                    | 12 (2.5)            | 1 (0.2)             | 4 (0.8)                 |
| 16 – 30  | 136                   | 102 (20.9)          | 21 (4.3)            | 13 (2.7)                |
| 31 – 45  | 230                   | 190 (38.9)          | 15 (3.1)            | 25 ( 5.1)               |
| 46 – 60  | 85                    | 72 (14.7)           | 5 (1.0)             | 8 (1.6)                 |
| 61 – 75  | 15                    | 11 (2.2)            | 3 (0.6)             | 1 (0.2)                 |
| 76 – 90  | 5                     | 2 (0.4)             | 3 (0.6)             | 1 (0.2)                 |
| Total    | 489                   | 389 (79.6)          | 48 (9.8)            | 52 (10.6)               |

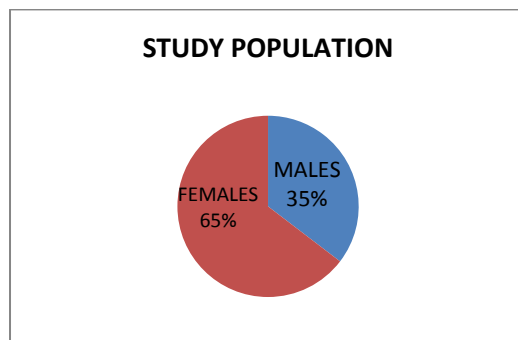


Fig. 1: Sex Distribution of HIV and PTB Infection

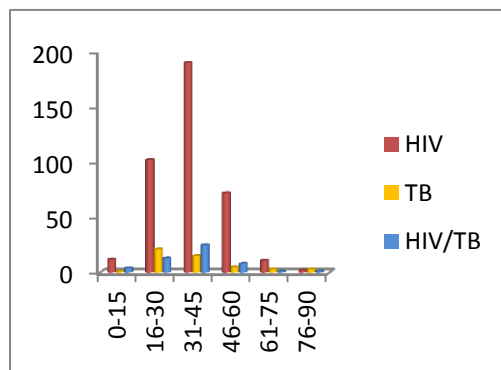


Fig.2: Age Distribution of HIV, TB and HIV/TB co infections

## DISCUSSION

The prevalence of PTB in HIV/AIDS patients is a dual epidemic problem of major concern worldwide more so in sub-Sahara 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 (WHO 1992) and almost 80% of these people reside in Africa (Kochl, 1991). One third of all people living with HIV/AIDS (PLWHA) worldwide are co-infected with *Mycobacterium tuberculosis* (Abeld, 2002). Our study has shown a prevalence rate of 10.6% for HIV/PTB co infection with females having a prevalence of 6.3% and males a prevalence of 4.3%. This is in consonance with various studies carried out in Nigeria and other parts of the world. Onipede et al., (1999), Nwobu et al., (2004), Iliyasu and Babashani (2009), Jemikalajah and Okogun (2009) and Olaniran et al., (2011) in their separate studies reported prevalence rates of 12.0%, 10.8%, 10.0%, 13.3%, and 13.9% in Irrua, Kano, Agbor and Ile-Ife South West Nigeria. There is a significantly increased prevalence of PTB/HIV co infection ( $P < 0.05$ ) among females than males. This may be due to the fact that women are more susceptible to HIV infection as a result of their involvement in sexual promiscuity than men, which is attributed to poor economic situation especially

poverty level and ignorance in the country thereby making the females at the mercies of the rich who demand for sex at every given opportunity. The co infection of HIV/TB is highest in the age group 31- 45 years which also has the highest prevalence of HIV. This is in agreement with previous reports of Yusuph et al., (2005), Pennap et al., (2009). This is the sexually active group in which both TB and HIV prevail most. However, this might result to socio-economic burden, and a threat to development in heavily infected HIV/TB areas as earlier stated by Jemikalajah and Okogun (2009). Conclusively, this study has afforded us the opportunity to create a data for the co infection of TB/HIV in this locality, aggressive public awareness and good health education to our populace, to stem down the spread of both HIV and TB in our community, in addition to intensify case finding among the people presenting with symptoms to general healthcare services. More urgent efforts should be geared towards checking the spread of HIV infections especially in a depressed economy like Nigeria in order to drastically reduce cases of TB. Also patients with dual infections should be closely monitored and put on appropriate therapy to improve the patients' state of health, reduce drug resistance and prolong life span of infected individuals.

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