

## PREVALENCE OF TUBERCULOSIS AMONG HIV/AIDS SEROPOSITIVE INDIVIDUALS ATTENDING FEDERAL MEDICAL CENTERS OF IMO AND ABIA STATES, NIGERIA

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### ABSTRACT

There is varied information concerning the prevalence of Tuberculosis (TB) among Human Immune Virus (HIV) -infected patients in the Nigerian Population. In this study, we investigated the prevalence of TB among 246 HIV/AIDS sero-positive individuals aged 20 to 60 years who are receiving care in the Federal Medical Centers of Imo and Abia States. The study is a Cross-Sectional design. The participants were 118 males (48%) and 128 females (52%). Information obtained from the hospital records showed the HIV/AIDS status of the individuals. Questionnaires were used with the informed consent of subjects to obtain responses from the subjects. Six research questions guided the study. Data from questionnaires were collated and analyzed using SPSS Version 20. Of the 246 HIV/AIDS seropositive patients, 59 (24%) were positive for HIV/AIDS and TB co-infection. The prevalence of TB and HIV/AIDS co-infection was higher in males 45 (18.3%) compared to females 14 (5.7%) ( $X^2 = 24.912$ ,  $p = 0.00$ ), and among secondary school level of educated subjects 20 (8.1%) than any other level of education ( $X^2 = 25.785$ ,  $P = 0.000$ ). The Co-infection values among participants vary among the various age groups, but they are not significant (31-40 years (8.13%), 51-60 (5.7%), 41- 50 (4.5%), ( $X^2 = 14.267$ ,  $P = 0.006$ ). Age, Gender and Level of education were significant ( $P < 0.001$ ). Marital status and occupation did not show any significant value on the prevalence of TB and HIV/AIDS co-infection ( $X^2 = 8.857$ ,  $p = 0.186$  and  $X^2 = 5.959$ ,  $P = 0.114$ ). Generally, this study showed a high prevalence of TB among HIV/AIDS

seropositive individuals. Adequate effort should therefore be made to reduce TB among people living with HIV through TB preventive therapy and by universal access to antiretroviral therapy. Knowledge is said to translate to power; health education should be given particularly to HIV infected persons with emphasis on how to stay safe from TB infection. Screening for TB the same time the HIV screening is carried out, will help to identify early infection of TB as well as help for early treatment. Since age, gender and education are significant in the co-infection prevalence of HIV and TB; planned intervention programmes could be focused on persons within this group.

**Keywords:** Prevalence, HIV/AIDS, Tuberculosis (TB), Co-infection.

## INTRODUCTION

Tuberculosis (TB) and Human Immune-deficiency Virus (HIV) have been closely linked since the emergence of AIDS (Odaibo, 2010). Worldwide, TB is the most common opportunistic infection affecting HIV-seropositive individuals, and it remains the most common cause of death in patients with AIDS. HIV infection has contributed to a significant increase in the worldwide incidence of TB. By producing a progressive decline in cell-mediated immunity, HIV alters the pathogenesis of TB, greatly increasing the risk of disease from TB in HIV co-

infected individuals and leading to more frequent extra pulmonary involvement. 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 (Odaibo, 2010). In response to these health emergencies, the World Health Organization (WHO) has developed an expanded strategy aimed at reducing the burden of HIV-related TB infection through close collaboration between TB and HIV/AIDS programmes. Infection with HIV is a common

risk factor for the development of TB. The joint statement by the American Thoracic Society, Centers for Disease Control and Prevention, and Infectious Diseases Society of America recommends that all patients with HIV undergo testing for TB after counseling (Odaibo, 2010). Although there is scanty information on the true incidence of tuberculosis in Nigeria, observations have shown that the disease has been on the increase over the past few years. According to Obionu, {2007};the situation is not different in many other regions of developing countries and may continue to be so in the foreseeable future unless an intensive control programme is embarked upon by such countries .The aim of this study is to determine the prevalence of TB among HIV seropositive patients in Imo and Abia states of South Eastern Nigeria. The World Health Organization (WHO) estimated that one third of the world's population is infected with *Mycobacterium*

*tuberculosis*, resulting in an estimated nearly 9 million new cases of active TB in 2010. Globally, TB remains the most common cause of death among patients with AIDS, killing 1 of 3 patients. Worldwide, 14.8% of TB patients have HIV co-infection, and as many as 50-80% have HIV co-infection in parts of sub-Saharan Africa. In some areas of sub-Saharan Africa, the rates of co-infection exceed 1,000 per 100,000 populations. Among TB-infected individuals in the United States with known HIV test results, 8.6% were HIV co-infected. Foreign-born individuals and members of ethnic/racial minority groups remain disproportionately affected by TB in the United States. Sixty percent of TB cases occurred in foreign-born persons, and TB rates among Hispanic, black, and Asian Americans were 7, 8, and 25 times, respectively, greater than rates for white Americans. Nearly half of TB cases in the United States occurred in the states of California, Florida, New York,

and Texas. The decline in HIV-related TB in the United States and other industrialized countries has paralleled an overall decline in TB cases. Increasing data demonstrate that antiretroviral therapy (ART) is effective in reducing the risk of TB, even in persons with higher CD4 cell counts. The CIPRA HT001 study demonstrated that starting ART at a CD4 count of 200-350 cells/ $\mu\text{L}$  compared with waiting until the CD4 count is  $<200$  cells/ $\mu\text{L}$  reduced the risk of active TB by 50%. Similarly, the HPTN 052 study found that initiation of ART at a CD4 count of  $\geq 350$  cells/ $\mu\text{L}$  as against waiting until the CD4 count dropped to  $<250$  cells/ $\mu\text{L}$ , was associated with a 47% reduction in the risk of active TB. A meta-analysis of the protective effect of ART on the development of TB demonstrated a 65% risk reduction in TB incidence across all CD4 cell counts. A substantial reduction of 57% was seen in persons with CD4 counts of  $>350$  cells/ $\mu\text{L}$ , and the greatest impact were seen

in those with CD4 counts of  $<200$  cells/ $\mu\text{L}$ : an 84% reduction in TB incidence (Gooze and Daley (2013]

Tuberculosis is the leading cause of death in people with HIV and also has an adverse effect on HIV progression. HIV/TB Co-infection places an immense burden on the health care system (Pawloski, 2012) and the mortality rate of untreated TB-associated HIV is believed to be very high (Corbett, 2007). There is varied information concerning the prevalence of TB among HIV - infected patients in the Nigerian population. Reports of similar studies in Nigeria reported 12.0% in Ile-Ife, 10.0% in Kano, 10.5% in Sagamu and 28.12% in Ibadan. These are much higher than the 4.39% and 5.91% also obtained in other studies in the Niger Delta region of Nigeria (Pondei and Lawani 2013) and (Nwabuko, 2012). There is no evidence of such studies in South Eastern States of Imo and Abia. This study becomes relevant in determining the prevalence of TB among HIV

seropositive individuals in these states with a view to controlling the disease with specific target intervention program. The major objective of the study is to determine the prevalence of TB among HIV/AIDS Seropositive patients in Imo and Abia States of South Eastern Nigeria and to identify the variation of this prevalence on the Demographic Status of the individuals. The significance of this study derives from the potential of the finding to contribute to the existing body of knowledge on the degree to which Tuberculosis is prevalent among HIV/AIDS patients in Imo and Abia States of South Eastern Nigeria. This study also helped us to appreciate how the degree of this prevalence vary with such other variables as Age, Gender, Occupation, level of education and Marital Status . With the knowledge of the association of these background variables one can design an intervention programs that are specifically tailored to the characteristic

background of the resident population.

## METHOD

This study was carried out in the Federal Medical Centers of Imo and Abia states of South Eastern Nigeria where a programme of HIV/AIDS and Tuberculosis management are being carried out. The study was carried out among 246 HIV/AIDS Seropositive individuals in Imo and Abia States of South Eastern Nigeria to assess the prevalence of Tuberculosis among HIV/AIDS seropositive individuals aged from 20 to 60 years, within a period of 30 days, that is between the 1<sup>st</sup> and 30<sup>th</sup> November 2015. Ethical approval was sought and obtained from the Health Research Ethics Committee (HREC) of Federal Medical Centre Umuahia. Informed oral consent was also obtained from all subjects of Federal Medical Centres of Owerri and Umuahia respectively. Purposive sampling was used because of the peculiar characteristics of

the subjects involved in this study and was applied at the point of treatment during their visit to the treatment unit of the medical centers where a programme of HIV/AIDS and TB management are being carried out. All HIV/AIDS persons observed to be receiving treatments of either drugs or counseling at the certified treatment centers and within the specified period of 30 days were identified as samples. The sample size of 246 was deemed to be sufficiently large enough as a representative of HIV seropositive individuals in Imo and Abia within the study period to estimate the prevalence of TB with adequate precision. A one-page structured questionnaire was designed which comprised of two major parts; patient bio-data section and the empirical data section. The Bio-data section contained all the variables of interest such as Age, Gender, Occupation, Level of Education and marital status. While the empirical data section contains

structured questions regarding the health of the respondents as it relates to the independent and dependent variables with a focus on the objectives of the study. The matrix question/response format is used which involves a standardized set of close-ended response categories used in answering the questionnaire items. This format uses space efficiently, makes it faster and easier for respondents to complete a set of questions and also increases the compatibility of responses given to different questions. These questionnaires of 14 question items were distributed to these HIV/AIDS seropositive individuals identified at the treatment centers within the study period. Subjects were instructed on how to fill the questionnaires. Their responses which formed the study data were collated, compiled and analyzed. The structured questionnaire were administered on Face-to-Face direct contact with the respondent. In this Face-to-

Face administration of questionnaire, the mass-administration method is employed in a sort of small waiting hall (in the Chest Unit and HAART to HAART) where respondents were addressed jointly. An informed consent of the respondent was received before the actual administration of the questionnaire. The rate of incomplete and "wrong" responses due to poorly understood questions were drastically reduced as clarifications were sought and given in the process. The respondents were pleaded with and encouraged to participate and were reassured of their anonymity. The nursing officers on duty, Care givers and group support attendants helped to distribute and collect back the questionnaire. The illiterate persons who could not read or write were also assisted to fill their questionnaires by their care givers and support group attendants. There was no language barrier since the

respondents were communicated to in English Language and their local dialect. A total of 255 questionnaires were distributed, out of which 246 were completed and counted valid for use in the analysis of data. Data was analyzed with Chi-Square ( $\chi^2$ ) using Statistical Package for Social Sciences (SPSS) version 20. Data was also presented using simple frequency distribution table and percentage calculated. It was also tested in line with the stated hypotheses. The statistical significant effects for demographic variables (Age, Gender, Level of Education, Occupation, and Marital Status) as contained in the Objectives of the study were determined by the one-way analysis of variance (ANOVA) and Chi-Square ( $\chi^2$ ) test and expressed using tables and charts. A P-value of  $< 0.05$  was considered significant in all statistical comparisons.

## RESULTS

### Prevalence of Tuberculosis among HIV/AIDS Seropositive Individuals.

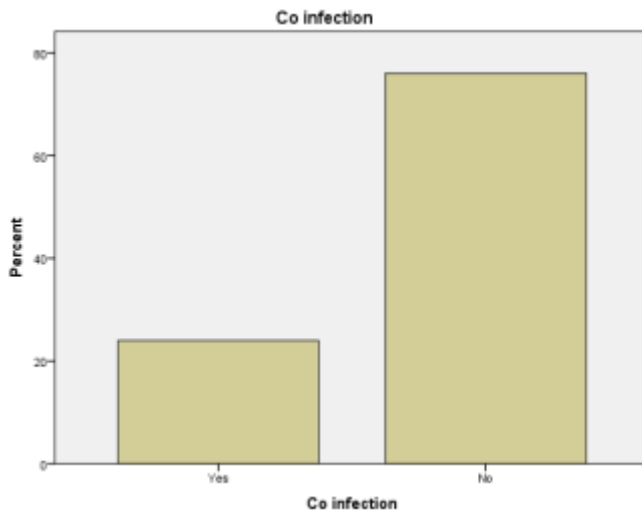
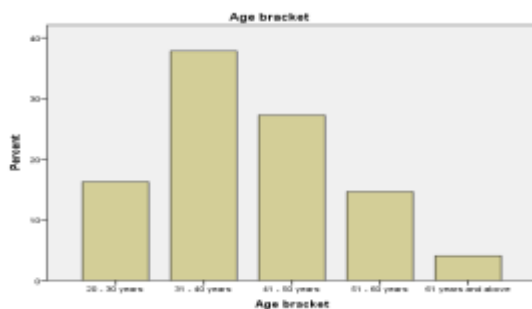


Fig 1: Bar-Chart showing the TB and HIV/AIDS Co-infection prevalence in Imo and

Based on the findings of this study, there is a prevalence rate of **24.0%** of Tuberculosis among Human immunodeficiency virus/Acquired immune deficiency syndrome seropositive individuals in Imo and Abia states of South

Eastern Nigeria. Among the 246 subjects of HIV/AIDS seropositive individuals, it was found that 59 of the people which constitute 24.0% of the study sample were TB/HIV Co-infected.

### TB and HIV/AIDS Co-infection Prevalence in Relation to Age.



Bar-Chart showing pictorial representation of TB/HIV-AIDS Co-infection



Those within the ages of 31-40 years recorded more HIV/TB Co-infection (at 8.13%,  $\chi^2=14.267$ ,  $df=4$ , Contingency Coefficient = 0.234,  $p=0.006$ ) than other age groups. Age was

significantly related to the TB/HIV-AIDS Co-infection status. The least being people of 61years and above with about 2.4% TB/HIV Co-infected.

### TB/HIV-AIDS Co-infection prevalence in Relation to Gender

Variables	HIV/TB Co-infection		Total
	Yes	No	
Gender			
Male	45	73	118
Female	14	114	128

$\chi^2=24.912$ ,  $df=1$ , Contingency Coefficient = 0.303,  $p=0.000$ . The male gender in the population was more TB/HIV co-infected (18.3%) than their female counterpart (5.7%) in the region, although the female gender recorded the highest rate of HIV/AIDS positive status of 52.0% (128/246) than males 48.0% (118/246).

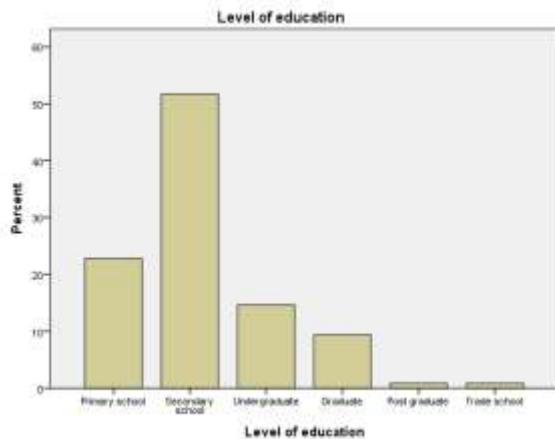
### HIV/TB Co-infection prevalence in relation to Occupation.

Variables	HIV/TB Coinfection		Total
	Yes	No	
Occupation			
Public service	23	50	73
Student	8	20	28
Trader	20	97	117
Farmer	8	20	28

$\chi^2=5.959$ ,  $df=3$ , Contingency Coefficient = 0.154,  $p=0.114$

In relation to Occupation, results did not reveal any significant relationship between occupation and TB/HIV-AIDS Co-infection ( $\chi^2=5.959$ ,  $df=3$ , Contingency Coefficient = 0.154,  $p=0.114$ ). Traders of the study population were more infected with TB/HIV Co-infection (17.0%) than other subjects. Students and Farmers of the HIV seropositive study population were found with TB/HIV Co-infection of 3.3% respectively.

### TB and HIV/AIDS Co-infection Prevalence in Relation to Level of Education.



**Fig. 3 Bar- Chart Showing the Pictorial Representation of Co-Infection**

The Level of Education of the respondents was found to be significantly associated with tuberculosis condition ( $\chi^2=25.785$ ,  $df=5$ , Contingency Coefficient = 0.308,  $P=0.000$ ). Those with secondary school level of education were found to have more persons with TB

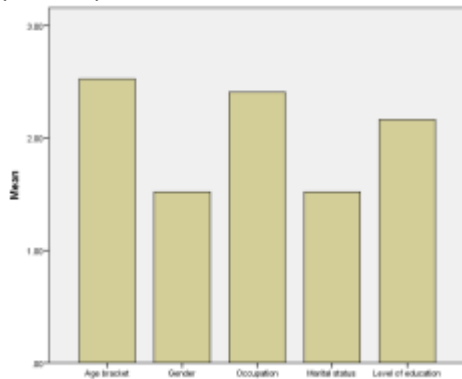
and HIV/AIDS co-infection. Those who hold higher qualification (post graduate) had less.(2%) cases. However, subjects with primary to undergraduate level of education presented higher percentage of TB and HIV co-infection.

### TB and HIV/AIDS Co-Infection Prevalence in Relation to Marital Status

Variables	HIV/TB Co-infection		Total
	Yes	No	
Married	41	123	164
Single	16	32	48
Widowed	2	20	22
Separated	0	12	12

$\chi^2=8.857$ ,  $df=3$ , Contingency Coefficient = 0.154,  $p=0.186$ . Marital status showed no significant relationship with the occurrence of TB/HIV Co-infection ( $\chi^2=8.857$ ,  $df=3$ , Contingency Coefficient =

0.154,  $P=0.186$ ). TB/HIV-AIDS prevalence was more among the married subjects (16.7%) than the singles of the study population (6.5%).



**Bar - Chart showing Mean value of various demographic variables.**

Age, occupation and level of education showed more significance in the population than gender and marital status which showed no significance.

## DISCUSSION OF FINDINGS

HIV/TB Co-infection places immense burden on the health care systems (Pawlowski, Jansson, Skold, Rottenberg, Kallenius, 2012) and the mortality rate of untreated TB - associated HIV is believed to be very high (Corbett, Watt, Walker, Maher, William, Raviglione, Dye, 2003). There is variable information concerning the prevalence of TB among HIV - infected patients in the Nigerian Population. In this study, out of the 246 HIV/AIDS seropositive individuals sampled, we

observed that 59 were positive with TB/HIV Co-infection giving a prevalence of 24.0% infection in this group.

Our result is within the 10% to 41.2% obtained in other studies in Nigeria (Iliyasu, Babashani, 2009; Erhabor, Jeremiah, Adias, Okere, 2010; Onubogu et al, 2011; Pennap, Makpa, Ogbu, 2011), but much higher than the 4.39% and 5.91% obtained in other studies also in the Niger Delta region of Nigeria (Pondei and Lawani 2013) and (Nwabuko, Ejele, Chuku, Nnoli, Chukwuonye, 2012). According to

Pennap, Makpa, Ogbu, (2010), similar studies in Nigeria reported 12.0% in Ile-Ife, 10.0% in Kano, 10.5% and 14.9% among children and adults respectively in Sagamu and 28.12% in Ibadan. In 2011 in Nigeria, out of the 81% of notified TB patients tested for HIV, 26% of the tested TB patients were HIV - positive, whilst 224,000 HIV - positive people were screened for TB (WHO, 2012). These figures are different from what was obtained in Imo and Abia States of South Eastern Nigeria. This is suggestive of regional differences in the availability of testing in Nigeria. In relation gender, 18.3% (45/246) of the entire study population were co-infected males, who also form about 76.3% (45/59) of the HIV/TB co-infected population. This means that males recorded a higher prevalence of HIV/TB co-infection than females in this study. This is in line with similar studies in Enugu, South Eastern Nigeria where the highest prevalence of co-infection was recorded

among males (59.5%) than in females (40.2%) thereby indicating a male preponderance of 1.5:1 (Alaneme, Aki, Akata, Akande, 2012). However, it is contrary to several reports within Sub-Saharan Africa where the female gender were far more infected by TB and HIV co-infection than their male counterparts (Pennap, Makpa, Ogbu, 2010). Although Odaibo, Okonkwo, Lawal, Olaleye, (2013) did not observe any significant difference in the rate of co-infection in relation to gender. According to Girardi Enrico (2007), the level of immunodeficiency at which Highly Active Anti-Retroviral Therapy (HAART) is initiated and the response to HAART are important determinants of the risk of TB. And this risk remains appreciable even among those with a good response to Highly Active Anti-Retroviral Therapy (HAART), suggesting that other interventions may be needed to control the TB epidemic in the HIV- infected population. In line with the aforementioned, one reason for

this high prevalence of HIV/TB co-infection in males may probably be attributed to their poor response to Highly Active Anti-Retroviral Therapy (HAART) and issues regarding their health status. This is more so considering the fact that the South Eastern Nigeria is an enterprising and trade oriented region where men are more inclined to giving attention to their trades and businesses than issues regarding their health. A second reason is that Men in this region whether married or single are traditionally more disposed to multiple sex partners than their female counterparts. In a related study, Pondei and Lawani (2013) concluded that detection of TB/HIV Co-infection is clearly affected by the availability of opportunities for testing for both TB and HIV. As a result, the third reason for the high prevalence in males may be poor availability of males to access opportunities for testing for both TB and HIV. In relation to Age, a significant high prevalence of TB/HIV Co-

infection was observed among subjects in the age groups of 31-40 (8.13%), followed by 51-60 (5.7%) and then 41-50 (4.5%). Subjects in the 20-30 age groups are 3.3% of the study population. Therefore, Age was significantly ( $P=0.006$ ) related to the tuberculosis status. Marital status and Occupation had no significant relationship ( $P=0.186$ ) and ( $P=0.114$ ) respectively with the occurrence of co-morbidity. The level of education of the respondent was significantly ( $P=0.000$ ) associated with tuberculosis condition. Those who hold higher qualification (post graduate) had no cases compared to more seen between primary to undergraduate level). From the foregoing, therefore, and given the result, we hold that Age, Gender and Level of education were significant predictor at  $P < 0.001$ .

## CONCLUSION

Based on the findings of this study, there is a high prevalence rate of Tuberculosis among HIV/AIDS seropositive

individuals in Imo and Abia states of South Eastern Nigeria. And this rate is significantly high when compared to other places in the country and / or in the continents with respect to Age, Gender and Level of education.

### RECOMMENDATIONS

It is therefore recommended: That there be strict compliance to the centers for disease control and Prevention (CDC) recommendation that all newly diagnosed TB patients be tested for HIV after counseling. Reactivation of TB among people living with HIV can be reduced by TB preventive therapy and by universal access to antiretroviral therapy. A massive awareness campaigns be consistently organized for identified vulnerable population age groups, as well as planning and implementation of preventive and intervention measures to curb risky sexual practices /behaviours. Considering the social and enterprising nature of the vulnerable population

established in this study {30-40&41-50 age bracket}, it is also recommended that more localized sensitization and awareness be consistently conducted in the market places, clubs and sports centres, viewing centres and other business engagement centres.

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