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Prevalence of HIV Infection in Pulmonary Tuberculosis Suspects; Assessing the Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

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Abstract

After decades of decline, TB made a dramatic comeback, a situation largely fuelled by the emergence of the HIV pandemic, amongst other factors, including overcrowding, poverty and weak health care system. HIV/TB co-infection, presently poses serious public health challenges especially in the African region, including Nigeria. The aim of this study was to determine the prevalence of HIV amongst PTB suspects in Nnewi, Nigeria. A total of 1544 pulmonary TB suspects assessing the Nnamdi Azikiwe University Teaching Hospital Nnewi who were screened for TB using Ziehl Neelsen Sputum smear microscopy were also subjected to HIV counseling and testing (HCT). Of the 1544 PTB suspects 184 (11.9%) reacted to HIV antibodies with a higher frequency in the females (13.3%) than the males (10.4%). Total of 237 (15.4%) of the 1544 suspects had pulmonary TB infection with the prevalence being higher in the males (19.9%) than in the females (11.2%). A total of 22 (1.42%) were HIV/TB co-infected, with the males (1.6%) having a slightly higher frequency than the females (1.2%). The age distributions showed that the age groups of 31-40 and 41-50 years had the highest frequencies for HIV and TB infections in this study. The infection rate was lower among participants below 20 and above 60 years of age. More accurate method of detecting TB may be applied in future work to help understand the real burden of TB amongst HIV patients.

Keywords: HIV and Pulmonary Tuberculosis

Introduction.

Historically, tuberculosis (TB) has a lineage that could be traced to the earliest history of mankind having been in existence since 150,000-200,000 years ago.

It is believed that TB first made its ravaging presence felt in Europe and later got to the US, Africa and Asia through voyagers and early settlers (Neil *et al*, 2005).

With increased public awareness, knowledge and understanding of the disease, the discovery and availability of anti TB drugs by 1950s, increased personal and communal hygiene and wide spread use of BCG vaccines the incidence of tuberculosis began to decline in the early 1980s. Hence, medical experts expected its complete elimination by the 2010, especially in the industrial nations (Current Prevalence of TB-Tuberculosis, 2013).

However, this was erroneous as the global incidence of TB skyrocketed that in the US, for instance, the number of reported cases increased by 20% between 1985 and 1991 (Current Prevalence of TB-Tuberculosis, 2013).

Multiple factors, namely HIV/AIDS disease, emergence of multi drug resistant (MDR) TB, rise in global travel, overcrowding due to dislocations (when rural populations move to cities) or due to natural disasters like flooding, tsunamis and earthquake, extreme poverty and poor nutrition. Also weak political will of government resulting in weak health system, inadequate funding of control measures, poor laboratory services and irregular drug supply and delivery system contributed to the resurgence of TB (Murray, 2004).

HIV infection is the single most important factor for the resurgence of TB globally and the major reason for failure to achieve set TB control targets especially in areas with high prevalence (Glynn, 1998).

HIV and TB have synergistic interactions that speedily accelerate the decline of the host immune system, accentuating the progression of each other.

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People living with HIV/AIDS (PLWHA) have an exquisite vulnerability to TB and are 30-50 times more likely to progress to active TB, while the likelihood of progressing to full blown AIDS increases by 100 folds in HIV-TB co infected patients (De Cock, 2006).

HIV/TB co-infection, the presence of the two diseases at the same time in a patient, presently poses serious and major public health challenges especially in the African region, including Nigeria.

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. (Getahun *et al*, 2010)

In Nigeria the prevalence of HIV among TB patients increased from 2.2% in 1991 to 19.1% in 2001 and 25% in 2010, showing that the TB situation in the country is HIV-driven (US Embassy, 2012).

The country has the second largest number of people living with HIV-AIDS and accounts for 10% of the global HIV burden with approximately 215,000 HIV-AIDS related death in 2010 (USAID, 2012).

Anambra state, the host state of Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, is ranked 14th in the number of TB cases notified in 2010 by states and has an estimated 8.9% HIV prevalence ranking it 4th at the national level.(US Embassy, 2012).

Data are not commonly available on the TB – HIV co infection rates in the state unlike other parts of the country where co-infection rates ranging from 5.91% in the Niger Delta region (Nwabuko *et al*, 2012), 10.5% in Kano, (Iliyan *et al*, 2009), 18.4% in Lagos (Onubogu *et al*, 2010), 11.0% and 19.8% respectively in Benin city (Okoror *et al*, 2008 and Okoh *et al*, 2012) and as high as 40% in Ilorin (Salami *et al*, 2006) have been recorded.

The aim of this retrospective study was to ascertain the prevalence of HIV infection among Pulmonary Tuberculosis (PTB) suspects assessing the TB Laboratory of NAUTH, Nnewi between January 2011 and December 2012.

With the strategic location of the hospital in densely populated commercial town of Nnewi, the study will give an insight into the TB-HIV burden in the state.

Nnewi has an area dimension of 72km^2 and an estimated population of 155,443 (77,517 males and 77,926 females) with average population density of 2159 people per km^2

Methodology

The study population comprised of a total of 1544 PTB suspects who presented at the Directly Observed Treatment Short course (DOTS) laboratory, NAUTH, Nnewi, for sputum smear microscopy..

Sputum samples were collected based on the conventional method of on the spot day one, early morning and on the spot on day two (SMS) using clean transparent wide-mouthed sputum cups.

Smears, measuring 2x3 cm in diameter were made on grease free clean frosted slides, air-dried, heat-fixed and stained according to the standard operating procedure for the hot Ziehl Neelsen technique.

Smears were examined microscopically for acid fast bacilli (AFB) using oil immersion objective lenses and results were recorded according to the International Union against Tuberculosis and Lung Diseases (IUATLD)/WHO guide lines (FMOH 2010).

The HIV statuses of the 1544 were unknown as at the time of presenting sputum for smear microscopy.

All patients were subjected to HIV counseling after which blood samples were taken for HIV testing using the National algorithm. Test results were recorded accordingly and analyzed.

Results.

Of the 1544 PTB suspects 184 (11.9%) reacted to HIV antibodies with a higher frequency in the females (13.3%) than the males (10.4%).

Total 237 (15.4%) of the 1544 suspects had pulmonary TB infection with the prevalence being higher in the males (19.9%) than in the females (11.2%).

Twenty – two (22) (1.42%) were HIV/TB co-infected, with the males (1.6%) having a slightly higher percentage incidence than the females (1.2%).

The age distributions showed that the age groups of 31-40 and 41-50 years had the highest prevalence of HIV and TB infections in this study. The infection prevalence was lower among participants below 20 and above 60 years of age.

Discussion

Out of the 1544 PTB suspects, 730 (47.3%) were males while 814(52.7%) were females. Naturally females tend to seek medical attention much earlier than the males who in keeping with their stronger-sex and bread winner tendencies would not go to hospital until they were well down, so more females than males presented in the study.

A PTB prevalence rate of 15.4% was found among the 1544 suspects, with more males (19.9%) being infected than females (11.2%).

The higher prevalence in male subjects found in this study could be due to the commercial nature of Nnewi town. More men are involved in the trading activities and traditionally trading is done in overcrowded setting which is a risk factor for TB transmission.

The study also recorded a HIV prevalence of 11.9% among the 1544 pulmonary TB suspects. The gender distribution showed that more females were infected than the males.

The high percentage of infection recorded in the females could probably be due to their early exposure to sexual activities, the high level of infidelity of women in this town and the biology of the female reproductive organs.

Women are usually more exposed to bodily fluids than their male partners during sexual intercourse. Women's lower status may prevent them from having control over their sexual relationships, they may be afraid to resist sex or insist on the use of condoms (Jogunosimi, 2001). A relative reason could be because more females were screened in this study.

The study also showed a HIV/TB co-infection rate of 1.42% with the age distributions showing that the productive and reproductive age groups of 21-30, 31-40 and 41-50 years had the highest prevalence of HIV, while those below 20 and above 60 years had the least, affirming the devastating impacts of HIV and TB on the economies and reproductive lives of the individuals and the communities.

The HIV-TB co infection rate of 1.42% obtained in this study could be compared to 1.23% obtained in a rural tertiary care hospital in Punjab (Kaur *et al*, 2013).

However, it was quite lower than those obtained from other states of Nigeria where rates ranging from 5.9% to 40% have been documented (Iliyasa *et al*, 2009, Nwabuko *et al* 2012, Okoh *et al* 2012, Okoror *et al* 2008, Onubogu *et al* 2010, Salami *et al* 2006).

Co-infection rates could vary between study populations and regions, probably due to differences in prominent occupation and other socio-economic factors (Antionucci *et al*, 1995).

This study was limited to PTB suspects whose HIV status were unknown as at the time of presenting for sputum AFB microscopy and the Ziehl Neelsen's sputum smear microscopy technique was the only diagnostic technique used for TB case detection.

This method detects fewer than 60%of all new TB cases and as low as 20% of HIV/TB infection (IDSA 2007).

In the HIV/TB co-infected person, there is a direct and massive disruption of the granuloma structure and abolition of the containment of infections that the typical caseous necrosis seen in HIV -negative TB patient are seldom seen in the co-infected person, especially in one with CD+4 counts of less than 200/mm (Schluger,2005). This can lower cough expectoration and the TB bacilli load in the sputum of the HIV/TB patients below the 5000 to 10,000 bacilli/ml of sputum needed for smear microscopy to be positive(Pawlowski et al, 2012).

The sensitivity of the sputum smear microscopy is reduced in the HIV positive patients thereby underestimating the real burden of TB amongst HIV patients as many cases might remain undetected.

This may lead to delayed diagnosis and treatment and potentially to greater TB spread in the communities.

There is therefore recommendation for the uttermost need to complement ZN techniques with more sensitive methods including fluorescent microscopy, Gene –Xpert MTB/RIF rapid tests and Culture. This improvement if effected in future research may result in more accurate outcome.

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Table 1: The AFB microscopy, HCT and HIV/TB co infection pattern among the 1544 PTB suspects.

	Total No of patients	**Males**	**Females**
Number of patients	1544	730(47.3%)	814(52.7%)
Number of HIV positive	184(11.9%)	76(10.4%)	108 (13.3%)
Number of AFB positive	237(15.4%)	145(19.9%)	92 (11.2%)
Number of HIV/TB positive	22(1.42%)	12 (1.6%)	10 (1.2%)

Table 2: Age distributions of AFB, HIV and TB-HIV positive patients.

	Total	**HIV**	**AFB**	**TB-HIV**
Age(years)				
<20	**282**	15 (5.30%)	32 (11.4%)	0 (0.0%)
21-30	**344**	36 (10.5%)	76 (22.1%)	4 (1.2%)
31-40	**292**	56 (19.2%)	39 (13.4%)	5 (1.7%)
41-50	**242**	49 (20.3%)	45 (18.6%)	8 (3.3%)
51-60	**180**	16 (8.90%)	25 (13.9%)	5 (2.8%)
>60	**204**	12 (5.90%)	20 (9.80%)	0 (0.0%)