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Association of HIV to Pulmonary Tuberculosis in Chest Clinic of a General Hospital in Lagos, Nigeria

Article by Maclawrence Kolapo Famuyiwa,
Ph.D in Public Health, Texila American University
Email:- maclaw196@gmail.com

Abstract

Objective: *To determine the prevalence rate of Human Immuno-deficiency Virus(HIV) among tuberculosis (TB) patients in a general hospital in Lagos, Nigeria.*

Methods: *This is a cross-sectional study. Demographic information was retrieved from the register of TB patients, HIV testing was done through rapid testing and confirmation by the hospital laboratory. Descriptive statistics was used to get the characteristics of the study participants. Bivariate analysis was performed for estimation of odd ratio (OR) and 95% confidence interval (CI). Chi square was utilized for the determination of the relationships that exists between study variables. P-values <0.05 were considered significant.*

Results*: All the 130 patients gave consent to be tested for HIV. Eighty-eight (88) of the patients were male representing 67.7% of the patients and 85.4% of the patients had sputum smear positive pulmonary tuberculosis (TB) while the rest were sputum smear negative, 20 (15.4%) were HIV-positive. HIV prevalence among male patients was 13.6% (p value=0.42), but 19.1% (p value=0.42)among female patients. Prevalence of HIV among sputum smear positive pulmonary TB patients was 13.5% (p value=0.15) and 26.3% (p value=0.15) among sputum smear negative patients.*

Conclusions: *This study revealed that HIV prevalence is higher among pulmonary TB patients than among the general population in Nigeria. It further lays credence to the close link that exists between active TB and HIV/AIDS infection in Nigeria, and the higher proportion of sputum smear negativity is found in HIV positive patients. There is a need therefore for a program to address HIV/TB co-infection.*

Keywords: *Tuberculosis, HIV, co-infection, Lagos, Nigeria.*

Association of HIV to Pulmonary Tuberculosis in Chest Clinic of a General Hospital in Lagos, Nigeria

The Joint United Nations Programme on HIV/AIDS (UNAIDS) puts the estimate of the prevalence rate of HIV in Nigeria to be 3.2% (2.9%-3.4%) translating to about 3.4 million (3.1-3.7 million) people out of a population of about 160 million people(UNAIDS, 2014). One of the HIV prevention strategies is HIV cases detection and treatment, and so the ability to find HIV cases among TB patients with the aim of providing antiretroviral therapy (ART) will help not only in HIV/AIDS prevention but also in improving outcomes of TB treatment in HIV positive TB patients.(UNAIDS, 2011).

According to a World Health Organisation (WHO) report, TB still exists as a disease of major public health concern in Nigeria, with the country ranking 5th among the 22 high TB burden countries which collectively and notoriously accounted for 80% of the global burden of TB.(WHO, 2015). The same report also stated that the number of TB cases notified in Nigeria increased from 31,264 in 2002 to 90,307 in 2008, and that more than 450,000 TB cases have been successfully treated free of charge in the last five years in Nigeria. Meanwhile, TB is still regarded as the leading cause of death among HIV patients (UNAIDS, 2011). This unholy

alliance between HIV and TB epidemics has further compounded, in great significance the suffering and mortality attributable to each disease alone.(Raizada et al, 2008).

In the 2004 guidelines for HIV surveillance among TB patients released by the WHO, it was recommended that generalised and concentrated epidemics data from routine HIV should be used for the counselling and testing of all TB patients to form the basis for the surveillance (WHO, 2004, 20 June). The TB-HIV epidemic in Nigeria is said to still be unfolding according to the end of project report of Global HIV/AIDS Initiative Nigeria (GHAIN) in 2010, the report also stated that collaborative activities are more or less at an infancy stage in Nigeria and that there is a need for these activities to be further scaled up at all levels, by all tiers of government and its partners making available committed funds for the implementation of joint TB-HIV activities. In addition, surveillance provides necessary information for the monitoring of the effectiveness of joint strategies that are aimed at reducing the impact of HIV among TB patients.

The objectives of this study were to investigate the feasibility of screening TB patients registered for treatment in a TB clinic at a General Hospital situated in Lagos, Nigeria, and to describe HIV prevalence among these TB patients, with the main aim of determining the HIV prevalence rate among TB patients in Lagos, Nigeria.

Methods

A cross-sectional study of all TB patients registered for treatment in the health facility studied, was conducted between January and August 2015. This treatment centre is a catchment area for about 500 000 residents. The selection of this site was based on the fact that it serves a mixture of middle class and low class patients, also that it serves as a referral centre for all suspected TB cases from adjoining smaller health services centres. This centre also boasts of an array of well trained personnel, and an ample and conducive space for delivering health education and counselling of patients with an enhanced assurance of privacy and confidentiality.

All TB patients, diagnosed following National Tuberculosis and Leprosy Control Programme (NTBLCP) guidelines, and who gave informed consent were included in the study. A specially trained nurse and a laboratory scientist were used to provide health education, counselling and testing, with great concern about their privacy and confidentiality.

Data for this study were extracted from a standard TB/HIV registers maintained at the study site. The patients so registered, were tested for HIV using Rapid HIV kit. After the test, the results of those that were negative were handed over to them after post-test counselling. Those that were reactive were sent to the hospital laboratory for confirmation of their HIV status, where a cross check was done using a HIV I&II Determine Rapid kit, and those patients that were found to be reactive, were confirmed using two different ELISA, HIV Ag/Ab Combination made by Abbott Murex and HIV Anti-lab system kits, read by a Multiscan MS ELISA Reader. These TB patients, so confirmed for HIV, were given a post-test counselling and referred to the Anti-retroviral Therapy (ART) clinic of the hospital for further care and support services which included ART according to national guidelines for Nigeria.

Statistical analysis

Data were analysed using Statistical Package for Social Sciences (SPSS) V.20.0 (IBM Corporation). Summary statistics were computed for continuous variables. Frequencies were calculated for categorical variables. Chi-square was used to compare different variables between HIV-positive and HIV-negative TB patients. Bivariate analysis was performed for estimation of OR and 95% CI. A p value of <0.05 was considered significant.

Ethical requirement

The study was approved by the Ethical Review Committee of the hospital, which is a General Hospital under the auspices of the Lagos State Health Service Commission.

Results

All the 130 patients in the TB register gave consent to be tested for HIV after education and counselling, out of those tested, 20 of them were found to be HIV positive after confirmatory test was done and all the 20 patients whose confirmatory tests results were returned positive came back for their results, and all of them were successfully registered at the ART site.

Table 1: Distribution of tuberculosis patient according to their characteristics

Tuberculosis Patients	N	%
Characteristics		
Gender		
Male	88	67.7
Female	42	32.3
Age in years		
11-20	14	10.8
21-30	41	31.5
31-40	36	27.7
41-50	19	14.6
51-60	11	8.5
61-70	7	5.4
71-80	2	1.5
HIV status		
Negative	110	84.6
Positive	201	5.4
Sputum status		
*AFB Positive	111	85.4
*AFB Negative	19	14.6

*AFB = Acid Fast Bacilli.

Table 1 shows that the mean age is 35.6 years (range 12-72 years). Eighty-eight (88) of the patients were male representing 67.7% of the patients and 85.4% of the patients had sputum smear positive pulmonary tuberculosis (TB) while the rest (14.6%) were sputum smear negative. Twenty (20) of the respondents were HIV positive representing 15.4% of the respondents.

Table 2: Distribution of HIV status of tuberculosis patient according to their gender and age

HIV status Positive(%)	Odd Ratio (95% CI*) Negative(%)		P-value**	
Gender				
Male	12 (13.6)	76 (86.4)	0.67 (0.25-1.79)	0.42
Female	8 (19.5)	34 (81.0)	1.49 (0.56-3.98)	0.42
Age in years				
11-20	1 (7.1)	13 (92.9)	0.39 (0.05-3.18)	0.37
21-30	2 (4.9)	39 (95.1)	0.20 (0.05-0.91)	0.02
31-40	10 (27.8)	26 (72.2)	3.23 (1.21-8.61)	0.02
41-50	5 (26.3)	14 (73.7)	2.29 (0.72-7.27)	0.15
51-60	1 (14.3)	10 (85.7)	0.53 (0.06-4.36)	0.55
61-70	1 (9.1)	6 (90.9)	0.91 (0.10-8.01)	0.93
71-80	0 (0.0)	2 (100.0)	0 -0.54	
Forms of tuberculosis				
*** AFB Negative	5 (26.3)	14 (73.7)	2.29 (0.72-7.27)	0.15

*** AFB Positive	15 (13.5)	96 (86.5)	0.44 (0.14-1.39)	0.15

*****Confidence Interval
******From Chi square
***AFB=Acid Fast Bacilli

Table 2 shows that the prevalence of HIV among men was 13.6% and 19.5% among women (p value =0.42). Prevalence of HIV among sputum smear positive TB cases was 13.5% whereas prevalence of HIV among smear negative TB cases was 0.29%. Prevalence of HIV in TB patients between 18 and 44 years old was 26.3%. Of all the patients that are HIV positive, 13 patients representing sixty five (65) percent are≤ 40 years while prevalence of HIV among≥ 40 years old was 35%. Ten (10) patients representing 27.8% of the patients in the age group 31-40 years are HIV positive (p value=0.02).

Discussion

All the 130 patients in the TB register, that were used for this study, gave their consent to be tested for HIV after education and counselling, this 100% consent rate has rarely been recorded in other study, though a refusal rate of <3% was recorded in another study in Pakistan (Hasnain et al., 2012), this can be attributable to the quality of education received about HIV/AIDS by the patients.

There is a significantly higher risk of tuberculosis developing in people living with HIV than in those people not infected with HIV (Knox &Guglielmo, 2006), this is because of the weakening of the immune system that HIV causes and the ability to predispose those with latent TB infection and HIV to develop active TB disease.(Barnes, Bloch, Davidson & Snider, 1991). The HIV prevalence in TB patients (15.4%), found in this study, is higher than in the general population of Nigeria, which was 3.1% by 2012 (United Nations Children's Fund, 2013). This notable difference is to further confirm the correlation that exists between HIV infection rates in the general population and the risk of developing TB after exposure (Odaibo et al., 2006) which translates to mean that the higher the rate of HIV infection, especially in areas with high TB endemicity, the greater the risk of acquiring established TB infection and hence a higher rate of HIV/TB co-infection.

This HIV prevalence found in TB patients (15.4%) in this study is also a bit higher than the estimated HIV prevalence of 13 percent reported by the World Health Organisation for 2013, (WHO, 2014), but lower than the prevalence rate reported in other recent studies done around the same location, Akinleyeet. al. (2015), reported 25.1% in a study done in almost the same location with this study and Onubogu et. al., (2010) reported 18.4% in a similar location.

There is also a higher prevalence of HIV co-infection with TB in females than males in this study, 19.5% and 13.6% respectively, with a male to female ratio of the HIV infection being 1 to 1.5, this relationship between HIV status and gender is significant, and contradict result in some other centres in Nigeria (Nwobu, Okodua, &Tatfeng., (2004) in Edo, Taura, Sale, & Mohammed, (2008) in Kano; Umeh, Ishaleku, & Hieukwumere (2007) in Nasarawa and Nwachukwu, Orji, & Okereke (2009) in Abia), but corroborated other studies, (Akinleye, et al. 2015 and Onubogu, et al., 2010 in Lagos, Erhabor, Jeremiah Adias & Okere, 2010 in Port Harcourt, and Odaibo, Okonkwo, Lawal & Olaleye (2013) in Oyo state. Biological factors, such as a higher susceptibility to infection and behavioural factors such as early exposure to sexual activity that is common to women due to economic circumstances have also been adduced to be the reason why there is an observed higher infection rate in females than males (Nwobu et al., 2004). Another reason could be as a result of various customs in African countries that viewed women as subordinate to their husbands with little or no say in issues related to sexual relationship (Nwobu, et al, 2004)).Women are also said to be more likely to have lowered immunity probably because

of the stress produced by their biological, economic and cultural roles as care-givers (Umeh, et al 2007).

Daniel et al, (2005), alluded to a higher risk of infectious diseases in women of reproductive age than their male counterparts. This may also be because of the innate characteristics of the female gender to seek out solution to their medical and other problems quicker than their men counterparts, who rather view disclosure of their status, like any state of un-wellness, not compatible with their duty as the bread winner for their family, because of the discrimination they are likely to face when their employers get to know about their HIV status.

The 21-30 age group accounted for 31.5% of the TB patients studied and together with those in the 31-40 age groups accounted for almost three-fifth (59.2%) of all the TB patients studied, this corroborates many other works where it has been established that these age groups were the most vulnerable to TB infection. (Hasnain, et al., 2012,Nwachukwu et al., 2009, Nwobu et al., 2004,Onubogu, et al., 2010 and Umeh et al., 2007). These age groups, most affected by TB, are the most productive age groups and hence the reason why the disease should be promptly diagnosed and managed.

The Prevalence of HIV infection was 1.95 times higher among patients with sputum smear negative pulmonary TB in comparison with patients with sputum positive pulmonary TB this study (prevalence 26.3% vs 13.5% p value 0.15). Although this difference is not significant which could be attributed to the small sample size used for this study. This result is however, comparable to the deduced findings from a similar study in Ethiopia where the likelihood of HIV infection in smear negative patient was 1.78 more when compared with its likelihood in sputum smear positive TB patients, (Tadesse & Tadesse, 2013), though it was a bit higher, and this could be as a result of the difference in the incidence and prevalence rates of both countries and also because of the difference in the localities, demography and cultural orientations of the people of both countries.

Strength and limitation

The major limitation to this study is the few number of TB patients used for this study, and this was because of the tendency of the centre strictly practicing a Directly Observed Treatment, short course(DOTS), in which sputum positive patients are referred to the facilities nearest to their residences as prescribed by the WHO, so only TB patients that reside close to this treatment facility used for this study were registered for TB treatment in that facility.

Also, as a matter of ensuring that some patients that are co-infected with HIV and TB are able to receive their treatment under the same roof of the hospital, this treatment site tends to retain some patients that are HIV positive, who ordinarily would have been referred to other facility in the centre, this practice no doubt, will limit the generalizability of the findings of this study for Nigeria, or even Lagos state.

However, the strength of this study lies in the fact that all the patients used for this study were made to test for HIV, a rarity in other previous study, this no doubt will contribute positively to the generalizability of these findings.

Conclusions

There is still a high prevalence of HIV co-infection among TB patients, this was further corroborated by this study. This rate of TB/HIV co-infection is still higher among female patients than the male patients.

Recommendations

This study further reveals that there is a need for emergency measures to strengthen the TB and HIV collaborative activities, more diagnostic and treatment centers should be provided, people less than 40 years, especially women, should be the primary focus of these measures. More

motivations of the personnel involved in the diagnosis and treatment, especially of TB. Immune boosting supplements should be provided as well as adequate prophylaxis against opportunistic infections. More centres should be provided with the Gene Xpert test facility, which has been acclaimed to be more sensitive in diagnosing TB and even Rifampicin resistance, especially when the result of sputum smear is negative.

The high prevalence of HIV/TB co-infection among the population studied, calls for better screening approach for TB in HIV infected people, and also better health education approach to forestall further spread of the disease from those currently infected to those un-infected.

Competing interests: The author declares that there is no competing interests.

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