

# **Mycobacterium Tuberculosis among Middle Aged Individuals Attending the T.B Unit in Aba South Primary Health Care Center Aba, Abia State Nigeria**

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Received: 21/11/2015

Revised: 10/12/2015

Accepted: 16/12/2015

## **ABSTRACT**

Tuberculosis is one of the most communicable infections known globally. The study on *Mycobacterium tuberculosis* among middle aged individuals referred to the T.B unit of Aba south primary health care center was investigated. Sputum specimens were sampled from May to August 2015. A total of 200 sputum samples were collected aseptically from patients and were examined for the presence of the bacterium, *Mycobacterium tuberculosis* using the Ziehl-Neelsen staining technique. Out of the 200 sputum samples examined, *Mycobacterium tuberculosis* occurred in 42 (21%) samples. Males tend to have had a higher incidence rate than females in the study and the infection rate was more among patients within ages 26-35yrs covering a population percentage of 7% of the total population examined, out of the 21% that tested positive to tuberculosis, 11% were males while 10% were females. Ages 16-25yrs had positive case occurrence of 2.5% for males and 3% for females, individuals aged 26-45yrs had an incidence rate of 4% for males and 3% for females while those within ages 36-45yrs had an incidence rate of 1.5% for males and 2% for females those within ages 46-55yrs had an incidence rate of 2% to 1% for females and those greater than 56 had an incidence rate of 1% males against 1% for females, of these 200 patients that participated in the study, 28 (14%) were HIV confirmed patients while 14 (7%) were uninfected with HIV. This shows a high prevalence of tuberculosis among HIV infected individuals. *Mycobacterium tuberculosis* are of public health importance and needs effective control especially among young age groups; also this calls for the attention of public health workers, governmental and non governmental agencies for concerted effort against the bacterium in the area.

**Keywords:** Tuberculosis, Aba south, HIV, Sputum.

## **INTRODUCTION**

*Mycobacterium tuberculosis* otherwise known as MTB or TB (short of *Mycobacterium tuberculosis* or *Tubercle bacillus*) in the past was also known as Phthisis, *Phthisis pulmonalis* is one of the most widespread, most important contagious and deadliest form of

communicable diseases known to man and a leading cause of death due to a single pathogen worldwide (WHO, 2014),

Tuberculosis has existed in man since antiquity, patients with pulmonary tuberculosis would broadcast the *Tubercle bacilli* in droplets aerosols as they cough, sneeze, or even talk and infect those in

contact. A person with untreated pulmonary tuberculosis is estimated on the average to infect 10-15 persons annually (Kipp, *et al.*, 2008). A primary infection due to *Mycobacterium tuberculosis* may actively develop into clinical tuberculosis, passive as in apparent infection or remain latent in individuals for months or years depending on the various host and environmental factors. Overt tuberculosis thus could result from reactivating latent infection or from recent primary infection or secondary re-infection. It has been observed that the transmission of *M. tuberculosis* is favoured by dusty environment and overcrowding. Infections can be acquired from both close and casual contacts (Behera, 2010). The risk of becoming infected depends on such factors as the relative virulence of the strain, the intensity of exposure to an infectious tuberculosis case (closeness and duration), and the susceptibility and immune status of the exposed individuals (Shaw, *et.al.* 2004). It has been observed that only a small proportion of individuals infected with *M. tuberculosis* develop clinical tuberculosis and even then a wide clinical spectrum of severity of disease is observed in such individuals (Christian, *et.al.* 2009).

Life styles such as tobacco/cigarette smoking could increase the chances of developing clinical tuberculosis four-fold (Leung, *et.al.* 2004) due to the various effects of smoking on components of both innate and adaptive immunity (Stelwart, *et.al.* 2004). Exposure to indoor air pollution has been associated with tuberculosis among other broncho-pulmonary disease (Ezatti, *et.al.* 2001). Epidemiological studies have shown that risk of tuberculosis increases with close contact of sputum-smear positive patients and that the prevalence of clinical disease among intimate contacts of tuberculosis cases is high (Almeida, *et.al.* 2012).

**Study Area:** This study was conducted at the T.B unit in Aba south primary health center in Aba, Abia State Nigeria. Aba is a

city located at the south eastern part of Nigeria, the city is characterized by two different seasons rainy and dry season. The rainy season starts around March and lasts till the end of July with a peak in June, the rainy season is followed by a short dry break in August known as the August break which is a short dry season lasting for 2-3 weeks. This break is broken by a short rainy season starting around early September and lasting to mid October with a peak period by end of September, the ending of the short rainy season in October is followed by a long dry season. This period starts in late October and in December and late February. Aba lies in the latitude of 5°10'N, 7°19'E. Aba has a moderate rainfall and good climate that favors Agriculture, Commerce, School and Industry throughout the year. Aba being a commercial nerve center of Abia State accommodating different categories of people ranging from Civil servants, Business people, Farmers, Carpenters *et.c.* The town is characterized by overcrowding which is witnessed in the market places (one risk factor of tuberculosis). The T.B unit of Aba south primary health center is located at the heart of Aba, precisely in the Aba south local government council headquarters. People that are usually referred to the T.B center are mostly those who have been diagnosed with HIV and those with chronic cough. The government provides them with free medical checkups, and treatments.

**Sample Collection:** Sputum samples were collected from middle aged individuals referred to the T.B unit of Aba South Primary health care, center Aba, Abia State, these were those within ages 16-60 years, the samples were collected using clean and dry wide mouthed specimen containers. Sampling was carried out between May-August 2015.

**Sample Microscopy:** Sputum samples were examined for the presence of *Acid fast bacilli* (AFB) by microscopy after

Ziehl-Neelsen staining technique (Chigbu, *et.al.* 2004).

## RESULTS

Overall, 42.10% (42/200) comprised of male and female patients, 22.173% (22/200) for males and 20.37% (20/200) for females. Infection rate significantly differed between males and females. The table above shows the proportion of tuberculosis infected individuals according to gender. Sputum samples collected from a total of 200 patients made up of 108 (54.0%) males and 92 (46.0%) females were examined for *M. tuberculosis*. The proportion overall of infected individuals was 42.10%. Out of the number of infected individuals males accounted for 21.73% while females were 20.3%. There was a significant association between *M. tuberculosis* and gender of infected individuals. Males were more infected than females.

**Table1: Sex Related Prevalence Of *M.Tuberculosis* among Patients Examined**

Gender	No.Examined(%)	No.Infected(%)	P. Value
Male	108(54%)	22(11%)	0.05
Female	92(46%)	20(10%)	
<b>TOTAL</b>	<b>200(100%)</b>	<b>42(21%)</b>	

( $\chi^2$  CAL = 0.358,  $\chi^2$  TAB = 0.0201, Df = 1, P = 0.05)

**Table2: Age Related Prevalence Of *M. Tuberculosis* Among Patients Examined**

Age (Years)	Male (%)	Female (%)	P. Value
16-25	38 (19%)	11 (5.5%)	0.05
28-35	60 (30%)	14 (7%)	
36-45	37 (18.5%)	7 (3.5%)	
46-55	27 (13.5%)	(3%)	
> 56	38 (19%)	4 (2%)	
<b>TOTAL</b>	<b>200 (100%)</b>	<b>42 (21%)</b>	

$\chi^2$  Cal = 7.852,  $\chi^2$  Tab = 10.00, Df = 1, P = 0.05

Table 2 shows the age related prevalence of *M. tuberculosis* among patients examined. There was no significant between TB and age of patient. Age had no significant effect on tuberculosis in this study.

**Table 3: Prevalence Of Tuberculosis In Relation To HIV Infection**

HIV Status	No infected %	No uninfected	P. Value
+ Ve	28 (14)	0 (0.0%)	0.05
Ve	14 (7%)	158 (79%)	
42(21%)	158(79%)	200 (100%)	

$\chi^2$  Cal = 1465 23.12,  $\chi^2$  tab = 120720.10, Df = 1, P = 0.05

Table 3 shows the prevalence of tuberculosis in relation to HIV infection of patients examined during the study out of the 42 (21%) infected individuals with TB 28 (14%) of the population were positive to HIV and TB con-infection and 14(7%) of the population were positive to only tuberculosis. However, there was a significant prevalence of TB and HIV coinfection which shows that tuberculosis is dependent on HIV status.

## DISCUSSION

From the study undertaken, an overall prevalence of 21% of the population study were confirmed cases of *Mycobacterium tuberculosis*. This could be likened to other studies such as the one done by Emmanuel, *et al.*, on tuberculosis in Aba federal prison inmates in Abia state were 21.15% were stated to be smear positive for AFB in about the same population size of study (Emmanuel, *et al.*, 2012). Also, similar studies on *Mycobacterium tuberculosis* where 400 samples were examined for *Mycobacterium tuberculosis* in some parts of Abia state within two specified years. A prevalence rate of (18.20%) was observed. When the same study was carried out by the same researcher and in the same region, he noted that the prevalence rate was reduced (Nwachukwu *et al.*, 2006). This is not surprising as chemotherapy and awareness may have played a role in its reduction of trend of infection (Nwachukwu *et al.*, 2006).

Analysis showed that people within the ages of 26-35 had the highest number of those tested positive to AFB with the percentage of 7% of the population followed by patients within the ages of 16-25 covering the population percentage of 5.5%, this is followed by patients within the ages of 36-45 with the percentage of 3.5% which is followed by patients within ages 46-55 covering 3% of the population of study. Those greater than 56 years tend

to have recorded the lowest incidence rate of 2% of the population studied.

The relationship between TB and HIV co-infection was also recorded, the study showed a higher prevalence of TB among HIV infected individuals (14%) out of the overall 21% recorded cases. This shows a relationship with the study carried out by Ejikeme. *et.al.*, on TB and HIV infections in Umuahia, Abia state, where great number of people tested positive to both TB and HIV (Ejikeme, *et.al.*, 2010). Also, about 7% tested positive to only Tuberculosis this could be attributed to the fact that most of these individuals had come in contact with the disease causing organism and have low immune response against the disease attributed to bad environmental exposures and certain lifestyles such as Tobacco/cigarette smoking.

HIV is one of the main facilitators of the occurrence of tuberculosis in individuals this is due to the fact that HIV tend to bring down the immune response of the body, thereby making the body prone to entry of various pathogens, since the body immune system are weak and hence may not be strong enough to ward off the infections (Leung, *et.al.*, 1999). Most of the people have wrong notion that the disease is incurable, thus most do not visit the T.B units until cases become chronic, some claim to have resorted to natural or traditional therapy which do not cure the disease rather becomes a risk factor for the spread of the infection as well as the emergence of drug resistance strain for *Mycobacterium tuberculosis* (Nwachukwu, *et al.*, 2009). These local herbs which might have been employed by most of them might be structurally related to the first and second line drugs such as streptomycin, isonicotinic and hydrazide, rifamycin and quinolones. Incidentally, the herbs which have no pharmaceutical standardization in all respect will knock off all the strains of *Mycobacterium* organisms this leads to selection of

resistant strains.(Nwachukwu,*et.al.*,2006). Also a similar study by Chigbu, *et.al.*, 2004, in Abia state, Nigeria on *Mycobacterium tuberculosis* among people involved in certain occupation, he reported a prevalence among hairdressers and farmers, other profession reported to have the risk of the infection included teaching, timbering, driving, armed forces, students and pupils. Most of the students admitted that they stayed in small and poorly ventilated hostels with other students. Poor ventilation stands as a risk factor in the transmission of the bacterium. In Homes and hostels that are overcrowded, if one individual has the infection and lives in the overcrowded environment, he or she will circulate the infected air droplets to other individuals.

However, the higher prevalence of tuberculosis recorded among those within ages 26-35yrs in this study may be attributed to the fact that individuals within this age group had the highest population of those that attended the TB unit within the period of this study and also the age represented a higher population of workforce which means that they have more environmental exposure and may exhibit certain lifestyles such as tobacco/ cigarette smoking which could increase the chances of developing clinical tuberculosis four fold due to the various effects of smoking on components of both the innate and adaptive immunity (Leung, *et.al.*,1999).

## RECOMMENDATIONS

Tuberculosis is one of the very contagious infections and hence the need for measures towards the control. Every of the population of study occupies an important niche in the epidemiology of TB in Aba, individual members of each of the ages studied have been demonstrated on the basis of their membership in the population to be at higher risk for exposure to *M. tuberculosis*. the ages which have been recorded in this study as been the

highest prevalent individuals should not be recorded as the only ones prone to tuberculosis therefore it is necessary for control measures to be mapped out for tuberculosis, hence government or non governmental organizations should be encouraged to work with the health care providers towards creating enlightenment/awareness campaign to teach the public concerning tuberculosis and its risk factors and the need to get tested and treated. Also, studies pertaining to the infection notes that higher prevalence rates of disease occurs in dry seasons (Umo, *et.al.*, 2005) hence this suggest that government may need to consider the upsurge of infection during the dry season in their annual budgets and also creation of immunization resources should be seriously put into place.

Also, HIV/AIDS patients who are put at higher risk of infection due to their low body defense mechanism which tends to decline over time needs to adopt healthy life style so as not to put themselves at risk of Tuberculosis infection.

Also, overcrowding which is one of the factors to the spread of tuberculosis should be curtailed.

## CONCLUSION

This study has been able to establish the prevalence of *M.tuberculosis* infections among middle aged individuals attending the T.B unit of Aba south primary health center. The infections were observed to affect mostly economically and supportive group of the society. Also, tuberculosis has been proven to be very contagious and infectious hence the rise and spread of drug resistance and synergistic interaction with HIV, posing some challenges towards the control of TB. Laboratory expertise and resources are required for TB diagnosis. New anti tuberculosis drugs offer the promise of tuberculosis treatment. Strong political and financial commitments will be required to

achieve global control of tuberculosis and avert millions of unnecessary death.

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How to cite this article: Ihemanma CA, Ekeoma VU, Ejike BU. Mycobacterium tuberculosis among middle aged individuals attending the T.B Unit in Aba South primary health care center abia, Abia State Nigeria. *Int J Res Rev*. 2015; 2(12):739-744.

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