



Incidence, distribution pattern and HIV/AIDS occurrence among tuberculosis patients attending DOTS centre in a Nigerian Teaching Hospital

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ABSTRACT

Mycobacterium tuberculosis infection is still a devastating disease with an alarming rate of increase in prevalence, morbidity and mortality. HIV/AIDS infection has also dramatically increased tuberculosis (TB) prevalence as it accounts for the greatest number of AIDS presenting illnesses. A retrospective study was carried out to determine the TB incidence, pattern of distribution and HIV/AIDS among patients reporting for treatment at the DOTS clinic of Olabisi Onabanjo University Teaching Hospital (OOUTH) Sagamu from 2005 to 2007. TB incidence for the 3 years was 315 of which the highest number 119 (37.7%) occurred in 2007. The age range 25-34 years (29.52%) had the highest number of respondents and 50.5% of the patients were females. Mean age \pm SD were 19.69 ± 17.44 . Majority of the patients (95.2%) had pulmonary TB. Two hundred and seventy (85.4%) were new patients, 43 (13%) were relapsed patients and 2 (0.6%) were transferred patients. There was no significant statistical difference between incidence and age ($p=0.5051$), distribution pattern of the disease ($P=0.8206$), but a significant difference occurred between incidence and sex ($p=0.0333$). HIV/AIDS occurrence was highest 37 (35%) among the patients in 2006. Our findings revealed a steady increase in TB incidence for the period under review and HIV/AIDS occurrence though high was not statistically significant.

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INTRODUCTION

Tuberculosis (TB) is a common and often deadly infectious disease caused by mycobacteria mainly, *Mycobacterium tuberculosis* (Kumar et al., 2007). The causative organism is transmitted exclusively by inhalation of infective droplets from

patients with open pulmonary tuberculosis through coughing, sneezing, talking or spitting (Johnston et al., 1974). In 2004, mortality and morbidity statistics included 14.6 million chronic active cases, 8.9 million new cases, and 1.6 million deaths, mostly in developing countries (WHO, 2006a). World Health

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Organization estimated that 9.2 million new cases of TB occurred in 2006 (139 per 100 000), including 4.1 million (62 per 100) new smear-positive cases. In terms of incidence cases, India, China, Indonesia, South Africa and Nigeria rank first to fifth, respectively. In all these global cases, Africa accounts for 31% while Asia accounts for 55% of the cases (WHO, 2008).

The prevalence, patterns of presentation and mortality from tuberculosis have been known to vary from one country to another and from one region of a country to the other. This variation depends on prevailing social factors such as socio-economic status of the people, malnutrition, crowded living conditions, incidence of HIV/AIDS, level of development of health infrastructures, quality of available control-programmes and degree of drug resistance to anti-tuberculous agents among other factors (Cancroff *et al.*, 1993; Delock, 1994).

The advent of HIV/AIDS infection has also dramatically increased its prevalence as it accounts for the highest number of AIDS presenting illnesses (Dye *et al.*, 2005) and also there is rising incidence of TB, especially pulmonary TB in HIV-infected patients. HIV infection has contributed significantly to the resurgence of TB especially in the sub-Saharan Africa (Busi *et al.*, 2004; Elizinga *et al.*, 2004).

In a ten-year review (Erhabor *et al.*, 1993) (1991-2000) of patterns of presentation and outcome of pulmonary tuberculosis in Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, the case records of 308 pulmonary TB patients were analyzed for pattern of socio-demographic distribution, clinical and radiological presentation, outcome of treatment and factors associated with mortality. The results showed that presentation peaked in the third and fourth decades and poor living conditions were significant risk factors in patients. The study

concluded that attention should be paid to improving the living standard conditions of the people and health education and treatment be made free or subsidized.

In a similar review in Edo state (Salami *et al.*, 2007), pulmonary tuberculosis accounted for 87% followed by abdominal tuberculosis (3.5%) and disseminated tuberculosis (2.5%).

In another study (Akinyoola *et al.*, 2007), a retrospective review of all patients with tuberculosis of the spine was carried out, 24 males (49%) and 25 females (51%) with a mean age of 32.8 were reported to be infected but students (30.6%) and traders (26.5%) were the most affected groups. Human immunodeficiency Virus (HIV) screening was confirmed positive in 2 (7.4%) out of 27 patients that had the test.

Since tuberculosis has become a major public health burden, studies like this should be conducted in all the states of the federation in order to sensitize the government to increase political will in the fight against this scourge. The main purpose of this study was to determine TB incidence, pattern of distribution and HIV/AIDS occurrence among patients attending directly observed therapy short course (DOTS) centre at the Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State.

MATERIALS AND METHODS

Study location

This study was conducted at the DOTS centre of Olabisi Onabanjo University Teaching Hospital (OOUTH), Sagamu, Ogun State which is located at the Southwestern Nigeria and acts as a referral centre to many primary and secondary health institutions both within and outside the state.

Data collection

A pre-tested and validated data collection format designed by the authors was

used for data collection. The DOTS register containing information of patients treated for tuberculosis between January 2005 and December 2007 in OOUTH, Sagamu was retrieved for data collection. Data extracted included age, sex, address, TB type, tests used for diagnosis, treatment status (new, relapse and transferred in) and HIV status which was then entered into the structured data collection form.

Ethical consideration

Permission to carry out the research was obtained from the ethical committee of Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State.

Limitations

The limitations included incomplete data in the register such as occupation and educational level.

Data analysis

Epi-info 2002 was used for data entry, validation and analysis. Chi-square test was applied for the comparison of proportions and evaluation of association of categorical variables as well as Graph pad InStat for one-way ANOVA test. Statistical significance was set at $P < 0.05$.

RESULTS

A total of 315 TB patients were reported at the OOUTH DOTS centre between

the periods of 2005-2007. The highest number of patients (119 (37.8%) reporting was in 2007 while the least, 90, (28.6%) was in 2005. The females had the highest number (50.5%) overall although males had the highest number of incidence in two consecutive years (2006 and 2007) with 56.6% and 52% respectively while the females took the lead in 2005 with 62%. There was statistical significance between sex and TB incidence (P -value=0.0333) as shown in Table 1.

Age range 25-34 years, mean age \pm SD 19.69 ± 17.44 had the highest incidence while the lowest was recorded in the age group above 65 years. There is however no statistical significance difference between age and TB incidence (P -value=0.5051, Table 2). Pulmonary TB was the most frequently (95.2%) seen among the patients with the highest (98.1%) recorded in 2006 as against 92.2% in 2005 while extra-pulmonary type gave insignificant values of 8%, 1.9% and 5% respectively for the three years (Table 3).

HIV occurrence among the patients was highest (35%) in 2006 and lowest (19%) in 2005 although it was 27% rate over all. There is however no statistical significance (p value =0.9180) as shown in Table 4.

The number of new patients reporting for treatment at the DOTS Clinic was 270, (85.4%) while relapsed cases was 13% and those transferred in from other centers was just 2, (0.6%) (Table 5).

Table 1: Sex distributions of TB patients for the period of study.

Gender	2005 Frequency (%)	2006 Frequency (%)	2007 Frequency (%)	Total frequency (%)
Male	34 (38.0)	60 (56.6)	62 (52.0)	156 (49.5)
Female	56 (62.0)	46 (43.4)	57 (48.0)	159 (50.5)
Total	90 (100)	106 (100)	119 (100)	315 (100)

$X^2=6.80$, $df=2$, p -value=0.0333

Table 2 : Age distribution of TB patients.

Age range	Male N= 156 Frequency (%)	Female N= 159 Frequency (%)	Total N=315 Frequency (%)
<10	12 (7.7)	6 (3.8)	18 (5.7)
10-14	2 (1.3)	5 (3.1)	7 (2.2)
15-24	29 (18.6)	40 (25.2)	69 (21.9)
25-34	45 (28.8)	48 (30.2)	93 (29.5)
35-44	39 (25.0)	36 (22.6)	75 (23.8)
45-54	18 (11.5)	15 (9.4)	33 (10.5)
55-65	9 (5.8)	6 (3.8)	15 (4.8)
>65	2 (1.3)	3 (1.9)	5 (1.6)
Total	156 (100)	159 (100)	315 (100)

$\chi^2=6.30$, $df=7$, $p\text{-value}=0.5051$

Table 3: Type and gender distribution pattern for TB incidence from 2005-2007.

Distribution pattern 2005	Male N=35 Frequency (%)	Female N= 55 Frequency (%)	Total N=90 Frequency(%)
Pulmonary	32 (91.4)	51 (93.0)	83 (92.2)
Extra pulmonary	3 (8.6)	4 (7.0)	7 (7.8)
Total	35 (100)	55 (100)	90 (100)

$\chi^2=0.28$, $df=1$, $p\text{-value}=0.5961$

Distribution Pattern 2006	Male N= 60 Frequency (%)	Female N=46 Frequency (%)	Total N=106 Frequency (%)
Pulmonary	59 (98.3)	45 (97.8)	104 (98.1)
Extra pulmonary	1 (1.7)	1 (2.2)	2 (1.9)
Total	60 (100)	46 (100)	106 (100)

$\chi^2=0.10$, $df=1$, $p\text{-value}=0.747$

Distribution pattern 2007	Male N=62 Frequency (%)	Female N=57 Frequency (%)	Total N=119 Frequency (%)
Pulmonary	58 (94.0)	55 (96.5)	113 (95.0)
Extra pulmonary	4 (6.0)	2 (3.5)	6 (5.0)
Total	62 (100)	57 (100)	119 (100)

$\chi^2=0.01$, $df=1$, $p\text{-value}=0.938$

Table 4: HIV status of TB patients.

Status	2005 N=90 Frequency (%)	2006 N=106 Frequency (%)	2007 N=119 Frequency (%)	Total N=315 Frequency (%)
HIV Positive	17 (19.0)	37 (35.0)	32(27.0)	86 (27.3)
HIV Negative	73 (81.0)	69 (65.0)	87(73.0)	229 (72.7)
Total	90 (100)	106 (100)	119 (100)	315 (100)

One way ANOVA test: $F=0.8810$, $p=0.9180$

Table 5: Categories of TB patients on treatment.

Category	Male N= 156 Frequency (%)	Female N=159 Frequency (%)	Total N=315 Frequency (%)
New	129 (83.0)	141 (89.0)	270 (85.4)
Relapse	25 (16.0)	18 (11.0)	43 (13.0)
Transfer in	2 (1.0)	0	2 (0.6)
Total	156 (100)	159 (100)	315 (100)

$\chi^2=2.30$, $df=2$, $p\text{-value}=0.1617$

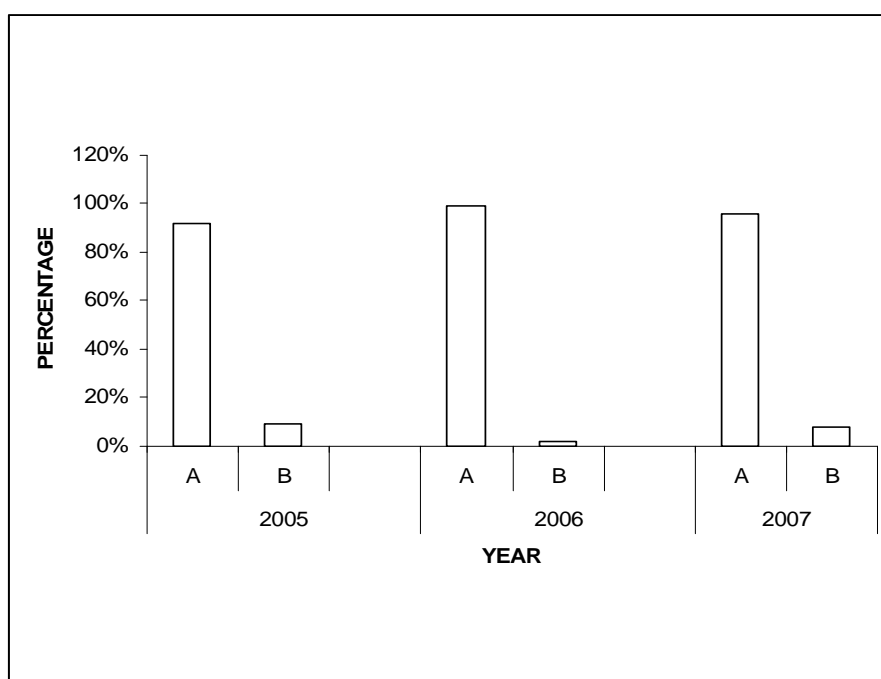


Figure 1: TB Incidence and distribution from 2005 to 2007.

A= Pulmonary tuberculosis; B= Extra- Pulmonary tuberculosis.

DISCUSSION

In this study, it was found that pulmonary tuberculosis was the most predominant type that recorded a result similar to previous studies (Odetunde et al., 1999; Salami et al., 2007) and steadily increased with each year.

TB incidence was slightly higher in the females compared to the males with a statistical significance. This is in contrast with a previous study (Salami et al., 2007) where there was no sex difference. Some studies

however recorded a slightly higher male population than that of the females (Okoduwa et al., 2004; Erah and Oghenevware, 2009). Although it has been reported in most parts of the world that more men than women are diagnosed with TB and die from it, WHO (2005) revealed that every year, over 3 million women contract TB and the disease is a leading cause of death among them. The disease predominantly affected those in the first, second and third decades of life which is consistent with a study by Salami et al (2007)

in which the disease also predominantly affected those in their first, third and fourth decades of life. This presentation pattern is the one mostly seen in developing countries like Nigeria where above 75% of TB cases were in age group less than 50 years compared to developed countries where those affected were mostly above 50 years. (Ahlburg, 2005). The age groups mostly affected are those who are actively engaged in pursuit of one endeavor or the other and are the most economically vibrant.

A high incidence of HIV (27%) co-existence with TB showing a close association between the two infectious diseases was recorded in this study. This finding differs from a study (Okodua et al., 2004) where the incidence of HIV/TB co-existence was 9.6% but similar to that of the national HIV infection rate among adult TB patients in Nigeria which was also estimated to be 27% by the WHO (2005). States like Borno, Plateau and Benue were also reported by the Federal Ministry of Health to have HIV/TB prevalent rates of 27%, 30% and 35% respectively (FMH, 2000). Higher HIV prevalence rates of 30-50% have also been found in TB patients in cities of developed countries (Brudney et al., 1991; Heckbert et al., 1992). Tuberculosis resurgence has been attributed significantly to HIV infections, poverty and social deprivation (Bare et al., 1999) and WHO estimated that nearly 10 percent of new TB patients are HIV positive (WHO, 2009).

Those receiving treatment at the DOTS Centre comprised predominantly new patients. These may be patients who reported on their own to the hospital or directed by friends/relatives to seek help in the hospital. Clinical data in Nigeria shows that the incidence of TB is on the increase (WHO, 2006b). Among other factors are those which are attributed to failure to detect a huge number of active TB cases which may primarily be responsible for the spread of the infection. Failure of national tuberculosis programmes to detect the vast majority of new infectious cases suggests that active screening

strategies should be re-evaluated in an attempt to improve case detection and thereby increase access to TB treatment (Murray et al., 1998).

Conclusion

Our findings revealed a steady increase in TB incidence, predominantly pulmonary type and female preponderance for the period under review. Co-existence of TB and HIV was non-insignificant. Tuberculosis incidence is still very high and alarming and needs every form of possible aggressiveness. Even though the high over-all co-existence of TB and HIV was statistically insignificant, it must still be viewed with great concern which should necessitate serious enlightenment campaign efforts to eradicate these twin devastating diseases.

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