STATISTICAL ANALYSIS OF PEOPLE LIVING WITH TUBERCULOSIS IN ONDO STATE

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ABSTRACT

This study reported cases of Tuberculosis diseases and those that co-infected with HIV among different age groups and gender between 2016 and 2020 in Ondo State, Nigeria. Chi-square test was used to investigate the relation that exist between the gender of TB patients and the HIV status. The result showed that the proportions of gender is found to be significant meaning that TB infection rate is higher in males compared to female. Also, 10% were co-infected with HIV and 90% were not. The difference in the proportions is found to be significant meaning that there were fewer number of patients that were co-infected with HIV as compared to those that were not. Also the proportions of those that were Pulmonary TB and Extra pulmonary was significant which depicts that there were fewer Extra pulmonary TB cases as compared to Pulmonary. This supports the fact that Pulmonary Tuberculosis which is contagious is expected to occur more frequently than extra pulmonary tuberculosis (non-contagious). The relationship between female TB patients that were likely to be co-infected with HIV than male TB patients was found to be significant.

Keywords: Tuberculosis, HIV, Binomial test, Prevalence, Pulmonary

INTRODUCTION

Tuberculosis (TB) is one of the severe contagious bacteria diseases that basically causes illness of the lungs. The spread of the bacteria that initiate Tuberculosis often occur when there is cough or sneeze by the infected patients. Majority of people infected with the bacteria that induce tuberculosis don't have symptoms. The symptoms include weight lost, night sweat, fever and cough sometimes with blood tinged. Treatment isn't always necessary for those without symptoms Cases with active symptoms of Tuberculosis necessitate a prolong course of treatment with numerous antibiotics.

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Leprosy and Tuberculosis forms severe causes of high incidence of complication in human health and death, especially in association with the HIV (Human Immunodeficiency Virus) and AIDS (Acquired Immune Deficiency Syndrome) infectious. Tuberculosis (TB) is a disease that is curable and preventable (Maber, 2006). The stigmatization suffered by the patients socially also complicate the problem of the disease. According to Paulson (2013), Tuberculosis (TB) has been proved to be most difficult and challenging infectious diseases face by humans. It is calculated that over one billion people has been killed by TB in the last 200 years. Currently, TB is still among the main worldwide causes of death by an infectious disease (Houben et.al, 2016). All over the continents, Tuberculosis (TB) is registered to be amidst severe ailment that causes the death of humans

(Lancelot, et al, 2012)**.** Nearly 8.7 million cases of Tuberculosis and almost 1.4 miion of deceases cused by Tuberculosis were recorded in 20111 alone. The hazard of TB is mostly conceived by the low- and middle-income nations (Johnbull et al, 2013).

In 2017, there were about10.4 million new TB cases recorded with 1.7 million related deaths worldwide (WHO 2017). In 2020 1.5 million People died from TB in with 214000 HIV cases included worldwide, 5.6 million cases of men, 3.3 million cases of women and 1.1 million children found to be ill with TB in 2020 (WHO 2020)

TB is an infectious disease that typically affects the lungs, though it can also involve other body parts. Pulmonary TB is active TB that affect the lungs while the Extrapulmonary TB is type of Tuberculosis that involves other parts of the body outside of the lungs, such as the bones or organs. The type of symptoms noticed depends on the affected part of the body. (Lotfian et.al 2017)

Nigeria with over 130 million population is recorded to be the 4th amidst twenty-two nations with critical burden of Tuberculosis in the world (WHO, 2006).

The annual figures of TB emerging cases in Nigeria are almost 368,000 making it the one with largest records in Africa among others. Different statistical studies have been done on TB in Nigeria but none has been done in Ondo State to the best of our knowledge. Ondo state in Nigeria was created on February 3rd 1976 from the former Western state. The Capital is situated at Akure, with a total population of 3.5million people (population censor 2006). A total of 1, 528 TB cases were discovered in Ondo State in 2012. It should be noted that TB burden is further compounded by the high prevalence in the country. To resolve the problem of TB burden, the establishment of National tuberculosis and Leprosy control programme was erected in 1998. The effectiveness of the programme took off in Ondo state in 1194. The program is governed by the state TBL regulatory body at the state level while TBLS supervisors at the local government level managed the program in the local government.

This research work expanciate the analysis of Tuberculosis in Ondo state, Western part of Nigeria using statistical method. A statistical review of all the cases of TB in the five years interval (2016-2020) considered ascertain prevalence of the diseases during the era under consideration. The study considered the age group, forms of Tuberculosis, gender parity and HIV co infection

MATERIALS AND METHODS

Secondary data from Ondo state TBL Control office at University of Medical Studies Teaching Hospital, Akure was used to find the analysis in this study. It was the report of people living with Tuberculosis and co-infected HIV patient in the state from 2016 to 2020. The data entails the gender.

Descriptive Statistics was used to summarize the data. Binary test was also used to get the proportion of the infected people between the gender, the age and those co-infected with HIV. Chi-Square was used to analysis the data.

RESULTS AND DISCUSSION

Table 1 shows the record of people living with TB in Ondo State between 2016 and 2020 as recorded in the centre. The Table indicate an increment in the population of people having Tuberculosis.

Figure 1 shows the prevalence of TB cases over the years with respect to gender. The infection rate is higher in male in each of the five years compare to the female.

Table 1: Prevalence of TB cases over the years

Year	2016	2017	2018	2019	2020	Total
TB cases	1803	1607	1606	1891	1900	8807

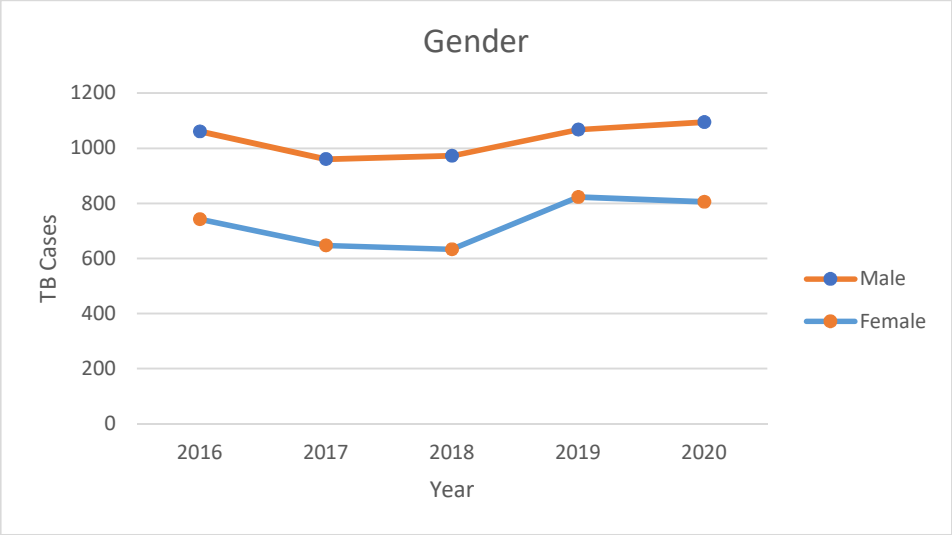

Figure 1: Prevalence of TB cases over the years with respect to gender

The differences in the TB infection rate between the genders is further investigated in Table 2. A binomial test was run on 8807 cases recorded between 2016 – 2020 to determine if the greater proportion of the TB patients were male compared to female. Of the 8807 cases, 5157 (59%) were males and 3650 (41%) were females. The difference in the proportions is found to be significant (p = 0.000) which depicts that TB infection rate is indeed higher in males as compared to their female counterparts.

Table 2: Binomial test for Gender

		Category	N	Observed Prop.	Test Prop.	Exact Sig (2-tailed)
Gender	Group 1	Male	5157	.59	.50	.000
	Group 2	Female	3650	.41		
	Total		8807	1.00		

Figure 2 shows that there are fewer number of patients that are co-infected with HIV in each of the five years.

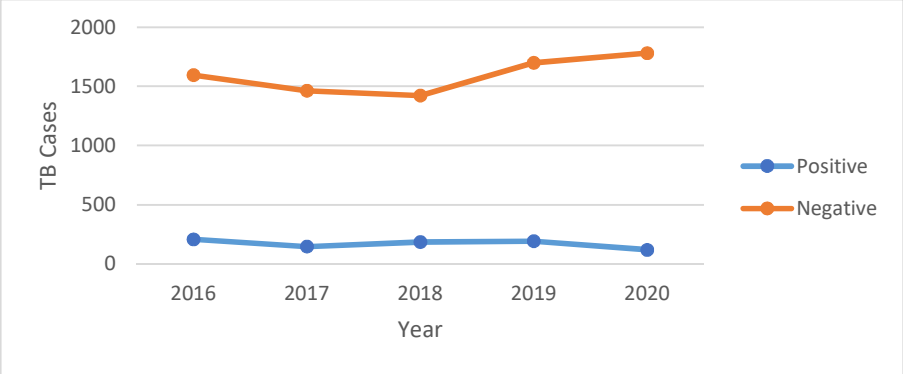

Figure 2: HIV status of the TB patients

In Table 3, a binomial test was run to compare the proportions of patients that were co-infected with HIV and those that were not. Of the 8807 cases, 846 (10%) were co-infected with HIV and 7961 (90%) were not. The difference in the proportions is found to be significant (p = 0.000) which depicts that there were fewer number of patients that were co-infected with HIV as compared to those that were not.

Table 3: Binomial test for HIV Status

		Category	N	Observed Pop	Test Prop	Exact Sig (2-tailed)
HIV Status	Group 1	Positive	846	.10	.50	.000
	Group 2	Negative	7961	.90		
	Total		8807	1.00		

Table 4 shows that there are fewer number of male TB patients that were co-infected with HIV than the number of female TB patients that were co-infected with HIV.

Table 4: HIV status with respect to gender

	HIV STATUS	
Gender	Positive	Negative
Male	375 (7.34%)	4782 (92.66%)
Female	471 (13.02%)	3179 (86.98%)
total	846 (9.7%)	7961 (90.3%)

Table 5 shows a chi-square test of independence performed in examining the relationship between the gender of TB patients and their respective HIV status. The relation between these variables was found to be significant, X^2 (1, N = 8807) = 78.34, p = .000. This depicts that female Tuberculosis patients were more suspected to be co-infected with HIV than male Tuberculosis patients.

Table 5: Chi- Square Test

	Value	Degree of freed.	Asymp.Sig.(2-sided)
Pearson Chi-Square	78.034[a]	1	.000
Likelihood Ratio	76.721	1	.000
Linear by Linear Association	78.025	1	.000

N of Valid Cases	8725		

Table 6 discuss the classification of the TB cases as recorded in the laboratory for the given year. The Table shows that the Pulmonary TB has a greater prevalence as viewed in relation to Extra pulmonary in each for the five years.

Table 6: Classification of the TB cases

	TB Cases		
Year	Pulmonary TB	Extra Pulmonary TB	Total
2016	1766 (97.95)	37 (2.05)	1803 (22.28)
2017	1578 (98.2)	29 (1.8)	1607 (19.85)
2018	1577 (98.19)	29 (1.8)	1606 (19.84)
2019	1846 (97.62)	45 (2.38)	1891 (23.36)
2020	1157 (97.47)	30 (2.53)	1187 (14.67)
Total	7924 (97.9)	170 (2.1)	8094 (100)

In Table 7, a binomial test was run to compare the proportions of Pulmonary TB cases and Extra pulmonary cases. Of the 8094 known cases, 7924 (98%) were Pulmonary TB and 170 (2%) were Extra pulmonary. The difference in the proportions is found to be significant (p = 0.000) which depicts that there were fewer Extra pulmonary TB cases as compared to Pulmonary. This supports the fact that Pulmonary Tuberculosis which is contagious is expected to occur more frequently than extra pulmonary tuberculosis (non-contagious).

Table 7: Binomial Test (TB Cases)

		Category	N	Observed Pop	Test Prop	Exact Sig (2-tailed)
TB Cases	Group 1	Pulmonary	7924	.98	.50	.000
	Group 2	Extra Pulmonary	170	.02		
	Total		8094	1.00		

Table 8: TB cases with respect to age group

				Age Group				
Year	0-4	5-15	15-24	25-34	35-44	45-54	55-64	≥ 65
2016	9(0.5)	51(2.8)	273(15.1)	441(24.5)	417(23.1)	278(15.4)	168(9.3)	166(9.2)
2017	18(1.12)	59(3.7)	252(15.7)	402(25)	378(23.5)	219(13.6)	139(8.7)	140(8.7)
2018	28(1.74)	72(4.5)	247(15.4)	349(21.7)	369(22.9)	278(17.3)	132(8.2)	131(8.2)
2019	32(1.69)	70(3.7)	288(15.2)	428(22.6)	418(22.1)	318(16.8)	168(8.9)	169(8.9)
2020	13(0.68)	41(2.2)	266(14)	400(21.1)	463(24.4)	307(16.2)	209(11)	201(10.6)
Total	100(1.14)	293(3.3)	1326(15.1)	2020(22.9)	2045(23.2)	1400(15.9)	816(9.3)	807(9.2)

In Table 8, the number of cases of TB is lowest among the age group of 0 – 4 (1.14%) while the number is at the highest among the age group of 35 – 44 (23.22%).

CONCLUSION

This study reported cases of Tuberculosis diseases and those that co-infected with HIV among different age groups and gender between 2016 and 2020 in Ondo State, Nigeria. It was shown that the relationship between female TB patients that were likely to be co-infected with HIV than male TB patients was found to be significant. In this research, it was discovered that the frequency of TB was significantly increasing. From the 8870 cases reported in this study, 5157 (59%) were males while the remaining 41% (3650) were females. This justifies the research work of (Johnbull et al, 2013) which ascertained that the prevalence of TB is more pronounced among men than women in the TB referral centre in South Southern Nigeria. This is in agreement with the study in TB referral centre in South-Southern Nigeria, this was also corroborated by the study of Obiora et al, 2004 and Nnorom et al 1996.

The gender parity was likely due to effect of biological and immunological evidences that signifies the possibility of men having more smear positive TB than women (Diwan and Thorson, 1999). The co infection of HIV with Tuberculosis occurred in 846 (10%) of the surveyed cases which is an improvement on the study conducted by (Nnorom, et al, 1996) in Benin City (a border state to Ondo State), a value of 33.9%. This advancement is in connection with the awareness programme about the disease and the danger of its combination with HIV diseases as publicizes by various NGO groups.

This work shows a greater number of infection occurred in the age range of 38p44. The findings is close to the results of Johnbull et al, 2013 in TB Referral Centre in South-Southern Nigeria between January2003 to December2012

In summary Pulmonary TB has a higher prevalence of 98% as compared to Extra Pulmonary that has only 2% rate of Tuberculosis.

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