Prevalence of Tuberculosis and Compliance to Treatment from 2010-2020 In Rivers State, Southsouth Nigeria

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ABSTRACT: *Tuberculosis is a highly contagious bacterial infection and it is still a leading killer of young adults worldwide. This study investigated the prevalence of tuberculosis and compliance to treatment from 2010 to 2020 in Rivers State, South-south Nigeria. The Ex-post factor design was utilized and it is aimed at collecting data and analyzing some variable retrospectively without manipulating any of the variables. Data were obtained from the Primary Healthcare Management Board and the State Ministry of Health covering a total of 525 (100%) healthcare facilities accounting for primary, secondary and tertiary health facilities including an overwhelming 191 (36.38%) private healthcare facilities. Data were analyzed using frequency and simple percentage including graphs. Findings inter alia reveals that the susceptibility and prevalence rate of Tuberculosis is higher in females than males, the highest prevalence rate of Tuberculosis in female (84.73%) was recorded in 2015 while that of the male (79.12%) occurred in 2016 respectively. The highest prevalence rate of Tuberculosis was 93.99% and it occurred in 2016 while the highest percentage compliance rate 48.99% was recorded in 2019. In addition, co-infections (TB/HIV) enhance the rate of Tuberculosis prevalence during the study period. Thus, it was recommended that effective awareness and sensitization campaign of the citizen via the churches, mosque, market unions, schools and anti-natal units among others on tuberculosis prevention and control be strengthened by all concerned agencies.*

KEYWORDS: Tuberculosis, prevalence, DOTs, treatment, compliance

INTRODUCTION

Tuberculosis abbreviated "TB", is a potentially serious contagious disease that principally affect the lungs. It is caused by Mycobacterium tuberculosis, and remains one of the most frequent causes of death in most developing countries [1]. Interestingly, some of the TB cases are considered as idle cases and one third of these idle cases population with the complaint of being infected [2] [3]. An estimated 10 of idle TB cases lately progress to active infection, especially in diabetic or mortal

immunodeficiency contagion (HIV) positive cases, or those immunological remedy [4]. Centuries past, TB has been a burden to human flesh with no knowledge for it cause(s) not until 1882 when Robert Koch discovered the Mycobacterium tuberculosis, an event that's now commemorated every time as (World TB DAY). The complaint is spread when people who are sick with TB expel bacteria into the air by coughing. Nigeria ranked fourth (4) among six (6) countries with the highest burden Tuberculosis. In 2015, Nigeria and five (5) other countries *vis-à-vis* India, China, Indonesia, South Africa and Pakistan accounted for 60% of the total Tuberculosis cases around the globe [5]. Rivers State ranked fifth (5) high burden status among the 36 states and Abuja, with its current burden estimated at above 16,000 [6].

Epidemiologically, tuberculosis (TB) is the leading cause of death from a single contagious complaint agent [7] and the leading cause of death among persons living with mortal immunodeficiency contagion (HIV) infection, counting for roughly 40 of deaths in this population [8]. The United Nations' (UN) Sustainable Development Goals [9] and the World Health Organization's (WHO's) End TB Strategy [10] have defined ambitious targets for 2020 – 2035, including a 35 reduction in the absolute number of TB deaths and a 20 reduction in TB prevalence by 2020, compared with 2015. Since 2000, WHO has produced periodic TB estimates for all countries [3].

However, TB is a curable disease globally. It can be cured in all patients by the universal acclaimed strategy known as directly observed treatment short course (DOTS). These DOTS Centre's are all over the Primary Healthcare Centre(s) in the rural and urban areas of the state. DOTS is management package that guarantee effective diagnosis and treatment of infectious cases. The DOTS strategy has been described as the most important public health breakthrough in TB management considering the lives that will be saved [11][12][13]. Eight (8) out of ten (10) patients from TB treated are cured by the DOTS approach and this account for its adoption by over 110 countries of the world [14] [15].

In Rivers State where the per capita income is less than one dollar per day, poverty, ignorance and poor adherence to drug regimen remain the major factors contributing to gross increase in TB and Leprosy case findings at all the Primary Health care Level in the 23 LGAs [15]. Such observation is alarming in a twenty first century and demand a change in all perspective to improve the public health status of the state at large. A recent report by [16] indicated that tuberculosis kills further women than any other single contagious complaint and is explosively associated with poverty. However, the aim of this study is to find out the prevalence of tuberculosis and compliance to treatment from 2010-2020 in Rivers State, South-south Nigeria.

MATERIAL AND METHOD

Study design
The Ex-post factor design was employed for this study. It is aimed at collecting data and analysing some variables retrospectively without manipulating any of the variables. Furthermore, relevant literatures on TB, it causes and prevalence were cited. Similarly, documents were obtained from Disease Control Unit of the State Ministry of Health and the Primary Healthcare Management Board.

Study Setting
Rivers State is a cosmopolitan state with Port Harcourt as it's headquarter. It has a geographical coordinate of latitude and longitude 4.8396°N4167 and 6.9112°Erespectively. It lies 9m above sea level with a tropical climate, and a significant rainfall pattern in most months of the year. It also has a short dry season with little effect. The average annual temperature is 26.4°C or 79.5°F with precipitation of about 2708 mm or 106.6 inches per year. The most precipitation occurs in September with an average of 141 mm or 16.3 inches. The driest month is January with 36 mm or 1.4inch rainfall, and warmest month of the year occurs in February, with an average temperature of 26.70 °C or 81.7°F. The variance in precipitation between the driest month and the wettest month is 378 mm or 15 inches (en.climate-data.org).

Data Analysis
Statistical analyses were performed using IBM SPSS version 25.0. Percentage and Chi Square were used to analyze the research questions while Pearson's Product-Moment correlation was used to analyze the relationship between the prevalence and compliance to tuberculosis treatment over the graded period of study.

RESULT

Distribution of DOTs Centres in Rivers State
The Primary Healthcare Centres recorded 309 (58.86%), while the Secondary Healthcare Centres had 23 (4.38%) and the Tertiary Health facilities had 2 (0.38%) whereas the Private sector had 191 (36.38%) respectively (Table 1).

Influence of Gender on Tuberculosis Prevalence from (2010 -2020) in Rivers State
Table 2 showed the analysis of TB reported cases (RC), Confirmed cases (CC) and prevalence based on gender. The result revealed that females had a total of 51400 RC, 43550 CC and a prevalence of 84.73% while the male counterparts had a total of 46547 RC, 36830 CC and 79.12 prevalence of TB in Rivers State. This implies that TB was more prevalent in females by 5.61% than in males. Thus, females are more at risk of TB than the male.

Table 1: Distribution of DOTs Sites in Rivers State

Health Facility	Frequency	Percentage (%)
Primary Healthcare Centre	309	58.86
Secondary Healthcare Centre	23	4.38
Tertiary	2	0.38
Private	191	36.38
TOTAL	**525**	**100.00**

Figure 1: Map of Rivers State showing various LGA

Table 2: Influence of Gender on Tuberculosis Prevalence in Rivers State from (2010 -2020)

Years	Female			Male		
	No. of RC	No. of CC	Prevalence (%)	No. of RC	No. of CC	Prevalence (%)
2010	2874	2411	83.89	2745	1554	56.61
2011	3005	2556	85.06	2945	2321	78.81
2012	3542	3121	88.11	3352	2743	81.83
2013	3875	3376	87.12	3538	2875	81.26
2014	3998	3587	89.72	3734	3126	83.72
2015	4129	3876	93.87	3985	3421	85.85
2016	4443	4104	92.37	4236	4002	94.48
2017	5372	4984	92.78	4654	3987	85.67
2018	6325	4998	79.02	5231	4142	79.18
2019	6843	5006	73.16	5984	4335	72.44
2020	6994	5531	79.08	6143	4324	70.39
Sum	51400	43550	84.73	46547	36830	79.12
Mean	4673	3959	84.73	4232	3348	79.12

*RC = Reported Case; CC = Confirmed Cases; Prevalence = (CC x 100)/RC

Extent of TB/HIV co-infection in Rivers State from 2010 – 2020
Table 3 showed the prevalence of TB/HIV co-infection in Rivers State from 2010 to 2020. The result revealed that there was no record of the TB/HIV co-infection in 2010. However, between 2011 and 2020, a total of 8864 cases were recorded with the highest cases recorded in 2014 and 2013 with case records of 1413(14.38%) and 1218(12.40%) respectively, while the lowest number of cases were recorded in 2019 [225(2.29%)] and 2015(6.50%) respectively.

Table 3: TB/HIV Co-infection in Rivers State between 2010-2020

Year	CC	%
2010	0	0
2011	849	8.64
2012	999	10.17
2013	1218	12.40
2014	1413	14.38
2015	638	6.49
2016	835	8.50
2017	865	8.80
2018	860	8.75
2019	225	2.29
2020	962	9.79
2020	9826	9.79
Total	**8864**	**100**

*CC=Confirmed Cases

Variation of TB Prevalence

The rate of TB prevalence varied from 70.56% in 2010 to 75.02 in 2020 in Rivers State. The highest percentage of 93.40% was recorded in 2016 while the least percentage was recorded in 2010. The second highest percentage of 89.93% was recorded in 2015 whereas the second least percentage of 72.82% was recorded in 2019 (Figure 2). There was sharp simultaneous increase of TB from 2010 to 2016 i.e., as the year increases so the prevalence increases. But in 2017 the trend changes from increase to decrease i.e., from 89.48% to 72.82% in 2019. There was an increase (75.02%) thereafter in 2020 (Figure 2).
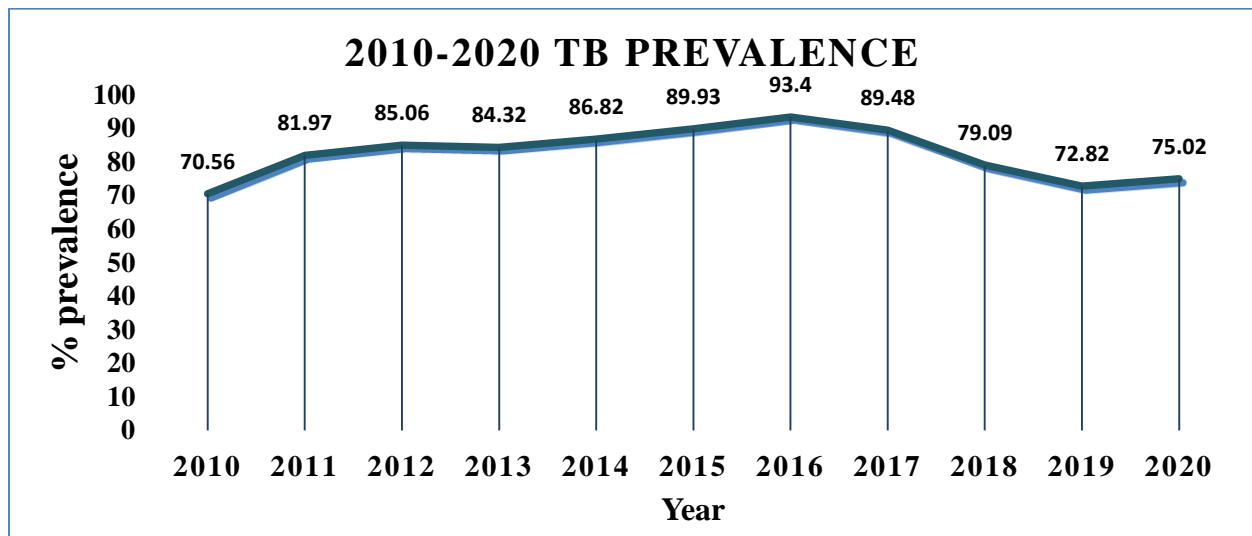

Figure 2: Percentage Prevalence of TB 2010-2020

TB Treatment Compliance

A treatment compliance rate of 25.80% was observed in 2010 and 40.82% in 2020. There was a steady increase trend all through the study period. The highest 48.99% percentage was recorded in 2019 followed by 40.82% in 2020 (Figure 3). The second least value of 27.33% was recorded in 2011, albeit, there was sharp drop of this trend in 2015 (29.04%) and 2016 (28.02%) congruently (Figure 3).
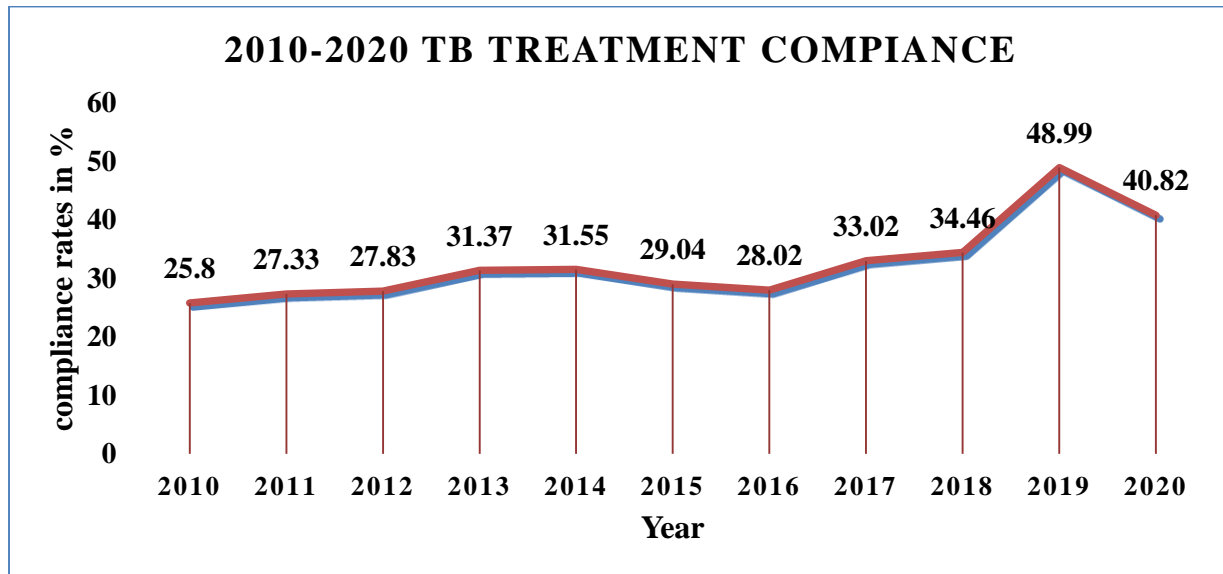
Figure 3: TB Treatment Compliance from 2010 -2020.

DISCUSSION

Tuberculosis as an infectious disease has been a public health issue because of its associated complexities. However, in Rivers State, government proactiveness to WHO policy guidelines on TB by way of creating more DOTs centers to combating TB scourge has created some level of leverage. This study revealed that 309 (58.86%) of the total 525 (100%) healthcare facilities (DOTs) were government based primary healthcare centers and 23 (4.38%) secondary healthcare across the State with the private sector having 191 (36.86%). This underscores the commitment between the government and private sector collaboration as it affects TB management. The 309 (58.86%) indicates that the rural centres are well captured as there are 23 local Government Areas in the State with only Phalga and Obio/Akpor respectively as the epic center of being urban (Port Harcourt). This is in line with the [17] on global Tuberculosis Report.

On gender parity of TB prevalence, the study revealed that females are more susceptible to TB than male counterparts. The percentage rate of prevalence of TB for female (84.73%) far out-ways that of the male (79.12%) in this current study. According to [18], the male to female ratio of TB susceptibility and prevalence is 1:1.5 out of 983 patients with pulmonary TB and 1:1.8 out of 130 with extra pulmonary TB. This is in line with the study carried out by [16] in Port Harcourt. The reason for this disparity could be attributed to the nature of women, their care patterns and often times they area most closet both in nucleus and extended family set-up in a typical African setting.

Furthermore, between 2010 to 2017, the percentage prevalence of TB increases from 83.89% to 92.78% for the females while the males increase from 56.61% in 2010 to 94.45% in 2016 and decreased to 79.12% in 2020. The sharp variability in prevalence observed in this study could be due to drug resistance or poor compliance to TB treatment by the recipients [19]. Thus, [20] maintained that strict and effective compliance reduces 90% of the risk associated with TB. More so, the highest prevalence of 93.87% for female was recorded in 2015 while that of the male (94.48%) was recorded in 2016. The increased prevalence may have occurred due to the co-infection factor.

The least compliance level of 25.8% was recorded in 2010 while the highest compliance level of 48.99% was recorded in 2019. The success recorded could be due to new strategies and policy formulations including improved drugs and effective monitoring by programme implementor(s) at all levels of the DOTs programme [16] [21] [22] and [23].

SUMMARY OF FINDINGS

1. The prevalence rate of TB in female is higher than the male.
2. The TB DOTs centers are evenly distributed the various Local Government Areas of the State.
3. The highest prevalence percentage for female occur in 2015.
4. The highest prevalence percentage for male occur in 2016.
5. The highest TB treatment compliance occur in 2019 for both male and female while the least occur in 2010.
6. The co-infection enhances the prevalence of TB and that the highest co-infection rate occurred in 2014.

CONCLUSION

Epidemiologically, Tuberculosis is a contagious disease that affects mostly the lungs of human, although, it has the potency to affect other parts of the body. It is caused by a bacteria called *Mycobacteria tuberculosis.* The disease affects all ages; however, government and international donor agencies have established DOTs centers to tackle the menace. However, the human induced factor inter alia poverty, ignorance, ineffective and total failure to TB compliance has given rise to the continuous increase in the prevalence of TB in the study area.

RECOMMENDATION

Sequel to the findings in this study, the authors recommended the followings:

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1. That effective education and sensitization awareness campaign be carried out to further boost the preventive and control strategies set up by concerned agencies. Such campaign should focus on areas like churches, mosque, market places, schools, anti-natal units, etc. This will bridge the communication gap that has contributed to the observed increases inadvertently.

2. Training and retraining of healthcare workers should be encouraged on treatment compliance support skills. This is very important because the healthcare workers to a great extent influence the health-seeking behavior of patients and acquiring the skills on how to persuade and convince patients to comply with treatment prescription will improve the compliance to treatment and in turn reduce the prevalence of TB due to relapse.

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COMPETING INTEREST

Authors have declared that no competing interest exist.

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