

Prevalence of Pulmonary Tuberculosis Disease: A Case Study in Hadejia Local Government Jigawa State, Nigeria

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Abstract

The risk to tuberculosis (TB) exposure is an area that need more attention worldwide due to the fact that close to one third of the population of the world is at risk. This study is aimed to determine the prevalence and treatment outcomes of pulmonary tuberculosis in tuberculosis and leprosy referral hospital, Hadejia Local Government area Jigawa State. The methods used were descriptive and inferential statistical techniques to analyze the outcome. The most affected age group was between 18-39 years with the percentage prevalence of (51.8%) while the age group 1-6 years recorded the lowest percentage of prevalence (2%). Male Patients had a higher prevalence at 70.8%, compared to 29.2% in females. Significant differences with respect to gender and age of the patients was observed at $p < 0.05$. A significant association was found between age and treatment outcome of pulmonary tuberculosis (PTB). The involvement of the private health practitioners in tuberculosis control activities should therefore be encouraged in order to improve case findings. The high prevalence of pulmonary tuberculosis (PTB) can be slightly attributed to some socio-economic factors associated with poverty such as adequate sanitary condition, lack of clean water and overcrowding.

Keywords: Prevalence, pulmonary, and tuberculosis.

INTRODUCTION

Pulmonary tuberculosis is a chronic infection course by *Mycobacterium tuberculosis*. The *Mycobacterium tuberculosis* (MTB) contains one of the nine bacterial species that causes tuberculosis (TB) in animals which include human beings. Approximate one-third of the global population is infected with tuberculosis infection or at the prone to tuberculosis infection. Within 9 million infected with active tuberculosis and nearly one million people die of this disease each year. Over 90% of cases and deaths due to tuberculosis occur in developing countries, of which, 75% are underage of 15-54 years old resulting in a great loss in cattle herds and humans (Riemann *et al.*, 1983; Ghaffari-Fam *et al.*, 2015).

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The German Microbiologist Robert Koch discovered the microbe that causes tuberculosis in 1882 and tuberculosis cases are targeted to be eliminated worldwide on or before 2025.

The outbreak and prevalence rates of tuberculosis in 2012 were 122 and 169/100000 people, respectively. An appraisal that only 67% of tuberculosis cases have been reported in 2012 (Ghaffari-Fam *et al.*, 2015). South Africa is a country with the highest number of people living with tuberculosis worldwide, there were 550 cases of 100000 population in 2003, 718 cases of one hundred thousand population in 2004 (Eslamifar *et al.*, 2008; Ghaffari-Fam *et al.*, 2015).

In 2014, an appraisal 9.6 million people got some diseases due to tuberculosis infection, about 1.5 million persons died from the illness containing 1.1 million HIV-negative people and 400,000 HIV clients (WHO, 2015; Agyeman and Ofori-Asenso, 2017).

Tuberculosis infection is one of the major public health challenge and the most common opportunistic infection among persons living with human immunodeficiency virus (HIV) infection. Delayed treatment of tuberculosis leads to the increase in death rate among individuals infected with the human immunodeficiency virus (HIV). Human immunodeficiency virus HIV is the maximum familiar risk factor for tuberculosis, and coincident infection with human immunodeficiency virus is the leading cause of morbidity and deaths in patients with HIV/AIDS (acquired immune deficiency syndrome) (Vahdatin *et al.*, 2013; Ghaffari-Fam *et al.*, 2015).

It was estimated to cause a global emergency with estimates of 1.8 million deaths worldwide in 2008 out of over nine million cases. In the same year, the estimated global incidence rate fell to 139 cases per 100,000 populations after reaching its peak in 2004 at 143 per 100,000. However, this decline was not homogeneous throughout the World Health Organization (WHO) regions, with Europe failing to record a substantial decline, but rather appearing to have reached a stabilization rate (WHO, 2009).

Pulmonary Tuberculosis (PTB) is a major public health problem in Nigeria. It was declared a national emergency in 2006 after which an emergency plan for the control of tuberculosis in Nigeria was developed. Nigeria is currently ranked 10th among the 22 high TB burdened countries in the world (Federal Ministry of Health, 2010).

Despite the support of Donor organizations such as the German Leprosy Relief Association and the introduction of directly observed treatment (DOTS), tuberculosis problems seem to be on the increase in most communities in Nigeria. Also, the observed number of referred patients that troop into Hadejia hospital for confirmation of diagnosis and treatment seems to raise the anxiety among the community members to an impending widespread of (PTB) infection. Monthly hospital records reveal that an average of 50 persons come to the referral center with the history of a cough that has lasted for more than two weeks for proper diagnosis. (Hospital records, tuberculosis referral hospital, Hadejia 2017).

With this average monthly record, the anxiety of the people seems to have risen. Therefore, the determination of the prevalence and management outcome pose a serious challenge.

METHODOLOGY

Research Design

This study was a retrospective study and the methodology employed in this evaluative case study that followed approaches used globally (World Health Organization and the International Union against Tuberculosis and Lung Disease) to assess the performance and quality of tuberculosis control programmed (Kassam *et al.*, 2000).

Area of Study

The area of study was tuberculosis and leprosy referral hospital, Tuberculosis Referral Hospital, Hadejia is located in Hadejia Local Government Jigawa State the Hospital is situated at latitude 11.50-11.83°N and longitude 10.10-10.16°E in Hadejia local government, Jigawa state with a population of over 450,000 people. Hadejia is in Jigawa central senatorial district, it has boundaries with the Malam-Madori north, Auyo, Kirikasamma and Kafin Hausa local government areas of Jigawa State.

The government owned hospital is headed by Sulaiman Muhammad, while the chief nursing officer is in charge of nursing services and other specialized staff. The hospital has seven (6) wards, made up of two (2) Leprosy Wards (old and new) for male one (1) and another for female one (1); two Tuberculosis Wards one for male and another for female patients and also D.R T.B wards one for male and another for female. There is a total of 60 beds in the seven (6) wards. The observed number of patients that troop the hospital for proper diagnosis and treatment of (PTB) was very high; hence the hospital was selected for the study.

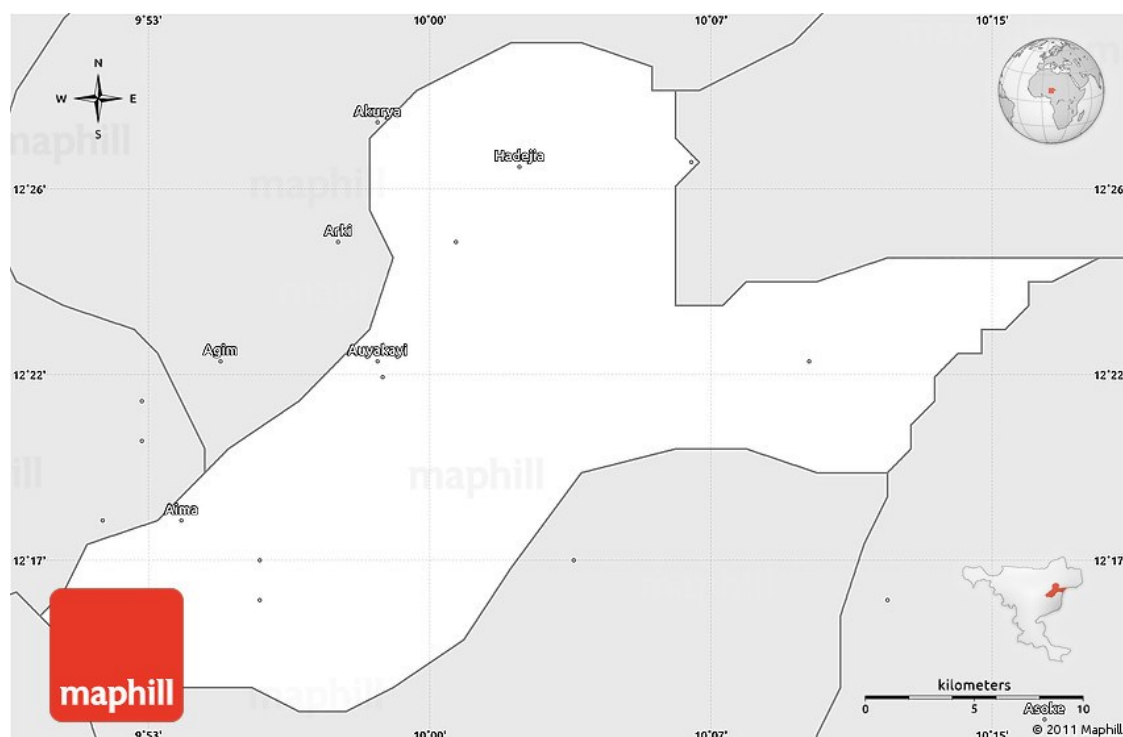


Figure 1: Map of Hadejia local government Jigawa State. (Source: maphill.com 2018)

Sample Size Determination

The sample size was based on the objectives to determine the prevalence of pulmonary tuberculosis in Hadejia local government. 548 patients registered (treated as out-client and in-client/admitted) in the tuberculosis central register Hadejia tuberculosis and leprosy referral hospital from January 2015 to December 2017.

Sampling Method

The researcher used a cross sectional survey on medical records, and the study took into consideration the number of patients that received monthly treatment in the hospital from January 2015 to December 2017 (Ghaffari-Fam *et al.*, 2015).

Data Analysis

The data were obtained from medical records of patients with pulmonary tuberculosis were analysed statistically using \pm SD and frequency (percent) chi-square (Ghaffari-Fam *et al.*, 2015). The results were presented in the tables below.

RESULTS

Table: 1 showed the grouped ages of the patients treated with their percentages, cured and not cured with pulmonary tuberculosis, patients age 1-6 are 11 (2%), 2 are cured while 9 are not cured, patient with age 7-17 are 31 (5.7%), 9 are cured while 22 are not cured, patients with age 18-39 are 284 (51.8%), 133 are cured, 151 are not cured, patients with age 40-59 are 159 (29%), 53 are cured, 106 are not cured, patients with age 60-80 are 63 (11.5%), 13 are cured, 50 are not cured. There was significant difference between the age groups at $p < 0.05$ in tuberculosis and leprosy referral hospital Hadejia local government, Jigawa State from January 2015 to December 2017.

Table 1: Treatment outcome of grouped ages of the Patients with Pulmonary Tuberculosis from Hospital Records

Age (Years)	Patients treated	Cured	Not Cured	P value
1 - 6	11 (2%)	2	9	
7 - 17	31 (5.7%)	9	22	
18 - 39	284 (51.8%)	133	151	0.000
40 - 59	159 (29%)	53	106	
60 - 80	63 (11.5%)	13	50	

Table: 2 showed the treatment completed, treatment not completed and cured of the patients with pulmonary tuberculosis patients aged 1-6 are 11 among that 3 are treatment completed, 8 are treatment not completed, 2 are cured, patients aged 7-17 are 31 among that 12 are treatment completed, 19 are treatment not completed, 9 are cured, patients age 18-39 are 287 among that 67 are treatment completed, 217 are treatment not completed, 133 are cured, patients age 40-59 are 159 among that 46 are treatment completed, 113 are treatment not completed, 53 are cured, patients age 60-80 are 63 among that 26 are treatment completed, 37 are treatment not completed while the remaining 13 are cured. There is no association between the patients that completed their treatment and those that do not completed their treatment at $p < 0.05$ in tuberculosis and leprosy referral hospital Hadejia local government, Jigawa State from January 2015 to December 2017.

Table 2: Patients data on treatment completed, treatment not completed and treatment outcome of Pulmonary Tuberculosis from Hospital Records

Age (Years)	Patient treated	Treatment completed	Treatment not complete	Cured	P value
1 - 6	11	3	8	2	
7 - 17	31	12	19	9	
18 - 39	284	67	217	133	0.04
40 - 59	159	46	113	53	
60 - 80	63	26	37	13	
χ^2					

Table: 3 showed the gender of patients, patients treated number and percentages, patients cured number and their percentage, patients not cured number and their percentage with pulmonary tuberculosis out of 548 total patients (100%), males are 388 (70.8%) and female are 160(29.2%) total cured are 210 (100%), males are 143 (68.1%) while female is 67 (31.9%), total of not cured are 338 (100%) which male are 245 (72.49%), and female are 93 (27.51%). There is no association between the treatment outcome of male and female at $p > 0.05$

Table 3: Treatment outcome for gender of Pulmonary Tuberculosis from Hospital Records

Gender	Patient treated		Cured		Not Cured		P value
	Number	%	Number	%	Number	%	
Female	160	29.2%	67	31.9%	93	27.51%	0.272
Male	388	70.8%	143	68.1%	245	72.49%	
Total	548	100%	210	100%	338	100%	

Table: 4 occupation, patients treated, cured with their percentage, and are not cured with their percentage with pulmonary tuberculosis the total patients number are 548, among that 210 (38.32%) are cured, 338 (61.68%) are not cured, civil servant patient is 126, among that 45 (35.71%) are cured, while 81 (64.29%) are not cured farmers patients are 92, cured are 20 (21.74%), not cured are 72 (78.2%), house wife patients are 91, among that cured are 41 (45.05%), not cured are 50 (54.95%), marketer patient is 59, cured are 29 (49.15)%, not cured 30 (50.85%), prisoner patient is 1, cured is 0 (0%), not cured is 1 (100%), students patients are 133, cured are 57 (42.86%), not cured are 76 (57.14%), traders patients are 20, cured are 8 (30.77%), not cured are 18 (69.23%), unknown patient occupation is 26, cured are 8 (30.77%), not cured are 18 (69.23%), in tuberculosis and leprosy referral hospital Hadejia local government, Jigawa State from January 2015 to December 2017.

Table 4: Treatment outcome in relation to patients Occupation of Pulmonary Tuberculosis from Hospital Records

Occupation	Patient treated	Cured		Not Cured	
		Number	%	Number	%
Civil servant	126	45	35.71%	81	64.29%
Farmer	92	20	21.74%	72	78.26%
House wife	91	41	45.05%	50	54.95%
Marketer	59	29	49.15%	30	50.85%
Prisoner	1	0	0%	1	100%
Student	133	57	42.86%	76	57.14%
Trader	20	10	50%	10	50%
Unknown	26	8	30.77%	18	69.23%
Total	548	210	38.32%	338	61.68%

The nationalities, State, and number of patients with pulmonary tuberculosis, Borno State have 2 patients, Bauchi State had 18 patients Jigawa State had 518 patients, Kano State had 1 patient, Yobe State had 8 patients, all these State in Nigeria while sufati State Niger country has only 1 patient, among the total patients number of 548, in tuberculosis and leprosy referral hospital Hadejia local government, JigawaState from January 2015 to December 2017.

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Table 5: Patients cured, not cured in relation to their nationality, State, with Pulmonary Tuberculosis in Hadejia local government, Jigawa State from Hospital Records

Nationality	State	Number of patient treated	Cured				Not Cured			
			Female	%	Male	%	Female	%	Male	%
Nigeria	Borno	2	1	50%	0	0%	1	50%	0	0%
Nigeria	Bauchi	18	1	5.6%	3	16.7%	2	11%	12	66.7%
Nigeria	Jigawa	518	90	17.4%	138	26.6%	64	12.4%	226	43.6%
Nigeria	Kano	1	0	0%	0	0%	0	0%	1	100%
Niger	Sufati	1	0	0%	0	0%	0	0%	1	100%
Nigeria	Yobe	8	1	12.5%	2	25%	0	0%	5	62.5%

Table 6 showed the patients cured and not cured based on their nationality, State, and local government area of patients that were attending the hospital

Table 6: Nationality, State, local government, number of patients, with Pulmonary Tuberculosis

Nationality	State	L.G.A.	Number of patient treated	Cured	%	Not Cured	%
Nigeria	Jigawa	Auyo	64	26	40.6%	38	59.4%
Nigeria	Borno	Maiduguri	1	0	0%	1	100%
Nigeria	Borno	Gamborin Gala	1	1	100%	0	0%
Nigeria	Jigawa	Birniwa	13	4	30.8%	9	69.2%
Nigeria	Bauchi	Shira	1	0	0%	1	100%
Nigeria	Bauchi	Gamawa	1	0	0%	1	100%
Nigeria	Jigawa	Gumel	1	1	100%	0	0%
Nigeria	Jigawa	Guri	16	6	37.5%	10	62.5%
Nigeria	Kano	Gwale	1	0	0%	1	100%
Nigeria	Jigawa	Hadejia	215	102	47.4%	113	52.6%
Nigeria	Jigawa	Jahun	4	2	50%	2	50%
Nigeria	Jigawa	Kafin Hausa	37	9	24.3%	28	75.7%
Nigeria	Bauchi	Katagum	1	0	0%	1	100%
Nigeria	Jigawa	Kaugama	29	9	31%	20	69%
Nigeria	Jigawa	Kirikasamma	55	16	29.1%	39	70.9%
Nigeria	Yobe	Machina	4	2	50%	2	50%
Nigeria	Jigawa	Maigatari	2	0	0%	2	100%
Nigeria	Jigawa	Malammodori	61	19	31.1%	42	68.9%
Nigeria	Jigawa	Miga	13	5	38.5%	8	61.5%
Nigeria	Jigawa	Ringim	1	1	100%	0	0%
Niger	Sufati	Sufatigure	1	0	0%	1	100%
Nigeria	Jigawa	Taura	6	2	33.3%	4	66.7%
Nigeria	Yobe	Damaturu	4	1	25%	3	75%
Nigeria	Bauchi	Zaki	16	4	25%	12	75%

Table 7 showed the treatment completed and treatment not completed base on their gender which the treatment completed of male are 107 (19.5%), treatment not completed of male is 281 (51.3%), while female treatment completed is 47 (8.6%), treatment not completed of female is 113 (20.65). There is no association between the treatment completed and treatment not completed at $p > 0.05$ out of 548 patients in tuberculosis and leprosy referral hospital Hadejia local government, Jigawa state January 2015 – December 2017.

Table 7: Gender, treatment completed, and treatment not completed of Pulmonary Tuberculosis from Hospital Records

Gender	Treatment completed	Percentage	Treatment not completed	Percentage	P value
Female	47	8.6%	113	20.6%	0.67
Male	107	19.5%	281	51.3%	
Total	154	28.1%	394	71.9%	

Table 8 showed the outcome of the patient cured and not cured base on the year, in 2015 total patients are 183, cured patients are 69 (37.7%) while not cured are 114 (62.3%), in 2016 total patients are 110, cured patient is 45 (40.9%), while not cured are 65 (59.1%), in 2017 total patients are 255, cured patients are 96 (37.6%), while not cured are 159 (62.4%), this showed that in 2017 we have high number of patients (255) with pulmonary tuberculosis while in 2016 we have low number of patient (110). There is no association between the treatment outcome based on the year $p > 0.05$ with pulmonary tuberculosis in tuberculosis and leprosy referral hospital Hadejia local government Jigawa State, Nigeria.

Table 8: Treatment outcome of pulmonary tuberculosis base on the year from Hospital records

Outcome	2015		2016		2017		P value
	Number	Percentage	Number	Percentage	Number	Percentage	
Cured	69	37.7%	45	40.9%	96	37.6%	0.823
Not cured	114	62.3%	65	59.1%	159	62.4%	
Total	183	100%	110	100%	255	100%	

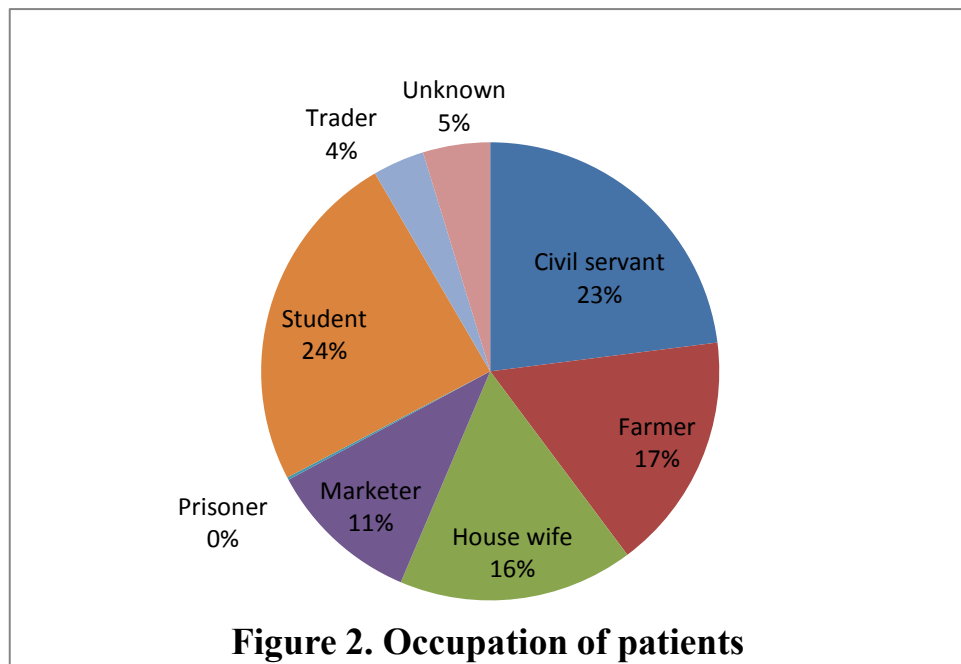


Fig 2 showed the percentages of patients base on their occupation which students have the higher percentage.

Discussion

In three years (3) total Case Detection Rate (CDR) was 548 (100%) while Treatment Success Rate (TSR) was 154 (28.1%). This was below the WHO target of 84% CDR and 87% of TSR, the result showed that the programme was not encouraging and it was in line with the study carried out by Maimela, (2009). This showed the poor performance compared to the WHO target. Tuberculosis is associated with poverty hence people referred to it as a disease of the poor. States that did not to achieve the set target by WHO, could be attributed to financial constraints on the side of the patients not having money to transport themselves to the hospital for treatment.

The data analyzed in the three (3) years reviewed showed 548 cases of pulmonary tuberculosis (New Cases). The prevalence was higher in the males than the females. Of the total number, the males accounted for 338 while the females were 160 in number. The prevalence was also high in ages 18-39 years who are regarded as the vibrant and productive group of the economy. These age groupstravel a lot there by finding themselves sometimes in an overcrowded area that can expose them to pulmonary tuberculosis. This was in consonance with the study carried out by Taura *et al.* (2008) in Kano; they concluded that males had the highest prevalence of pulmonary tuberculosis. The prevalence of pulmonary tuberculosis (PTB) in hospital under consideration, it could be attributed to the scourge of HIV which usually destroys the immune system thereby exposing the individual to pulmonary tuberculosis as an opportunistic infection. This was in agreement with the study carried out by the ZAMSTAR study Team (2009) in two Zambian communities where the prevalence of pulmonary tuberculosis (PTB) was associated with HIV infection. There are other risk factors such as smoking, excessive consumption of alcohol and drug abuse that can also contribute to the prevalence of pulmonary tuberculosis.

Any treatment in which a cure was not established (Sputum conversion) among tuberculosis cases will pose a danger to the community. Hence prevention of such occurrence is necessary to maximize the efficiency of tuberculosis control activities. The treatment outcome from the

records was discovered to vary between the three (3) years reviewed, 388 males and 160 females were cured.

Treatment completed for the males was 107 while the female has 47. From the study, the males were the most affected and they responded to treatment. For this reason, their default rate was also high. The age group 18-39 had the highest treatment outcome and they were also the most affected with pulmonary tuberculosis being the productive age of the economy. They defaulted a lot because they are not stable for one reason or the other. This was not in agreement with the study by Akinola *et al.*, (2009), on treatment outcome among pulmonary tuberculosis patients at treatment centers in Ibadan in 2009 which revealed that males had a higher risk of poor treatment outcome than females.

Fewer cured and discharged were recorded among the ages 0-10 years, this was because most of that age group do not produce sputum for investigation hence the programmed referred to them after six months of treatment as treatment completed (Sputum Smear not examined).

CONCLUSION

This study observed that the male population comprises the highest proportion of PTB and the productive ages were most affected. A significant association was found between age and treatment outcome of pulmonary tuberculosis PTB. The involvement of the private health practitioners in the tuberculosis control activities should therefore be encouraged in order to improve case findings.

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