Factors influencing outcomes of tuberculosis treatment among HIV-positive TB patients in Taraba State, North-eastern Nigeria

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A thesis submitted in partial fulfilment of the requirement for the degree of Master of Public Health

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ABSTRACT

Background: Tuberculosis (TB) and Human Immunodeficiency virus (HIV) infection remain the leading causes of morbidity and mortality among infectious diseases in Nigeria and Taraba State in particular.

Objective: To explore factors influencing the treatment outcome of TB among TB/HIV co-infected patients in Taraba State in order to make recommendation to improve treatment outcome.

Method: Analysis of cohort of TB/HIV patients registered in the state in 2013 using Microsoft Excel and EPI Info[7] and a literature review was done to identify relevant information on study objectives. An adapted socio-ecological conceptual framework was used to analyse the factors influencing treatment outcomes.

Findings: Death rate (DR) and cure rate (CR) were significantly associated with HIV positive status ($p<0.001$). Poverty, high levels of stigma and the weak TB/HIV integration and collaboration could be factors influencing the high death rate among TB/HIV co-infected patients in Taraba State. Other factors identified are low knowledge and misconception about TB/HIV, adverse drug effects, co-morbidity, weak intersectoral collaboration and weak community engagement in TB/HIV interventions.

Conclusion: Several factors were identified that could contribute to high DR among HIV positive TB patients. Therefore, exploring intersectoral collaborations, community enggagement and strengthening of health system may go a long way to contribute to reducing the high DR.

Key words: Tuberculosis, HIV, treatment outcome, mortality and treatment adherence.

Word count=12 354, Exam no=1013

LIST OF ABBREVIATIONS

AFB	Acid Fast Bacilli
AIDS	Acquired Immunodeficiency Syndrome
ART	Anti-Retroviral Therapy
BHF	Basic Health provision Fund
BMP	Basic Minimum Package
CBO	Community Based Organization
CDR	Case Detection Rate
CMD	Common Mental Disorder
CHW	Community Health Worker
DOTs	Directly Observed Treatment short course
FMC	Federal Medical Centre
GDP	Gross Domestic Product
GFATM	Global Funds to fight AIDs, Tuberculosis and Malaria
HAART	Highly Active Anti-Retroviral Therapy
HBC	High TB Burden Countries
HCT	HIV Counselling and Testing
HIV	Human Immunodeficiency Virus
HRH	Human Resources for Health
HSB	Health Seeking Behaviour
HW	Health Worker
IRIS	Immune Reconstitution Inflammatory Syndrome
KAP	Knowledge Attitude and Practice
LGTBLS	Local Government Tuberculosis and Leprosy Supervisor
LMIC	Lower Middle Income Countries
MDG	Millennium Development Goals
M&E	Monitoring and Evaluation
MNCH	Maternal, New-born and Child Health
NACA	National Agency for Control of AIDs

NAAT	Nucleic Acid Amplification Test
NCH	National Council on Health
NGO	Non-Governmental Organization
NLR	Netherlands Leprosy Relief
NPHCDA	National Primary Health Care Development Agency
NTBLCP	National Tuberculosis and Leprosy Control Programme
PAL	Practical Approach to Lung health
PEPFAAR	President's Emergency Plan for AIDs Relief
PLHIV	People Living With HIV/AIDs
PMTCT	Prevention of Mother to Child Transmission
PTSD	Post-Traumatic Stress Disorder
SDG	Sustainable Development Goals
SMOH	State Ministry of Health
SS	State Supervisors
SSH	State Specialist Hospital
TB	Tuberculosis
TS	Treatment Supporters
TSR	Treatment Success Rate
WB	World Bank
WHO	World Health Organization

GLOSSARY OF TERMS

Basic minimum package (BMP): "a set of health services as may be prescribed from time to time by the Honourable Minister of Health in consultation with the national council on Health''(FMOH 2014).

Case detection rate (CDR): "CDR is calculated as the number of new cases of TB reported to the National Tuberculosis programme (NTP) in a given year divided by the estimated incidence for the same year. The CDR is thus a ratio rather than a rate, but in the context of TB indicator, the term 'rate' has become standard terminology" (WHO 2014a).

Cohort: Group of patients in whom TB has been diagnosed, and who were registered for treatment during a specified time period (WHO 2014a).

Cure rate: Proportion of pulmonary TB patients with bacteriological confirmed (smear or culture positive) TB at the beginning of treatment that became smear or culture negative in the last month of treatment and on at least one previous occasion (NTBLCP 2014a).

Death rate: Proportion of TB patients that die for any reason during the course of treatment (NTBLCP 2014a).

Defaulter (Lost to follow-up) rate: The proportion of TB patients that do not start treatment or interrupt treatment for two or more consecutive months (NTBLCP 2014a).

Extra-pulmonary TB: This is a type of TB that affects one or more organs other than the lungs parenchyma (NTBLCP 2014a).

Human Resources for Health (HRH) or Health Workforce : Is defined by WHO as people who are engaged in action whose primary intent is to protect and improve health (WHO 2007).

HIV-negative TB patients: are TB patients who have a documented HIV negative result from a test conducted at the time of TB diagnosis (NTBLCP 2014a).

HIV-positive TB patients: are patients with TB who have a documented HIV positive result (from pre-ART register or ART register) or a HIV positive result from a test conducted at the time of TB diagnosis (NTBLCP 2014a).

Immune reconstitution inflammatory syndrome (IRIS): is paradoxical worsening of symptoms of prior infections that was seemingly diagnosed and treated successfully or an occult opportunistic infections in a TB/HIV co-infected patients as a result of immunological response due to improved immunity after commencement of ART and/or anti-TB treatment (NTBLCP 2014a)

Pulmonary TB: This is a form of TB that involves the lung parenchyma (NTBLCP 2014a).

Smear-negative pulmonary TB: 'Pulmonary TB that are negative for AFB with an Xpert positive result and whom a clinician prescribes anti-TB treatment' (NTBLCP 2014a).

Smear-positive pulmonary TB: 'Patient with at least one sputum smear-positive sample (at least one AFB is found in at least one sputum sample:

scanty results are considered as positive) and/or an Xpert positive result' (NTBLCP 2014a).

TB case: A person who has been confirmed to have TB disease (NTBLCP 2014a).

Treatment completed: **''**A Tb patient who completed treatment without evidence of failure but with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion'' (WHO 2014a).

Treatment failure: 'A TB patient whose sputum smear or culture is positive at month five or later' (WHO 2014a).

Treatment supporter: Is a person either a health worker, volunteer, trained community member or a guardian chosen by a TB patient to supervise his/her treatment throughout the course of the TB treatment (NTBLCP 2014a).

Xpert MTB/RIF: A rapid cartridge-based automated nucleic acid amplification test (NAAT) to detect Mycobacterium tuberculosis and rifampicin resistance strains within two hours (WHO 2013b).

INTRODUCTION

I worked as a medical officer in state hospitals for eight years and was subsequently posted to the public health department of the state Ministry of Health (SMOH) as an assistant director in the disease control unit overseeing the tuberculosis (TB) and leprosy control programme in Taraba State before coming to the royal tropical institute (KIT), Amsterdam. Based on my work experience and stint at the KIT, I have developed a keen interest in studying treatment outcomes among the various categories of TB patients in care in Taraba State, Nigeria.

Tuberculosis and HIV are diseases of significant public health importance in Nigeria with the national prevalence rates among adult population of 318 per 100,000 population (National tuberculosis and leprosy control programme 2012) and 3.5% (National HIV & AIDS and reproductive health survey 2013) respectively. The national TB/HIV co-infection rate was 23% in 2013 (NTBLCP, 2014). Similarly, Taraba State is a high TB/HIV burden state with an HIV prevalence rate of 10.5% (NARHS 2013) and TB/HIV co-infection rate of 30% (Taraba State tuberculosis and leprosy control programme 2014). Accumulating evidence indicate that higher mortality and poor treatment outcomes are more prevalent in HIV positive TB patients than in HIV negative TB patients (Odume & Njepuome 2009; Oshi et al. 2014; Belayneh et al. 2015; Murray et al. 1999).

This study aims to analyze the current treatment outcomes and explore the factors influencing the TB treatment outcomes including mortality among HIV positive TB patients in Taraba State.

Chapter 1: BACKGROUND INFORMATION

This chapter gives a short overview of Taraba State as relates to geography, socio-demography, socio-economy, health status, health system, the TB/HIV control programme and a brief epidemiology of TB/HIV.

1.1 Geography and population

Taraba State is one of the 36 states in Nigeria situated in the north-eastern region of the country. Projections from the 2006 national census indicate that Taraba State has an estimated population of 2.8 million people according to demographic health survey (DHS) report 2013 (DHS 2013). The map of Nigeria showing location of Taraba State is presented in figure 1 (Taraba State information 2012).

Figure 1: Maps of Nigeria and Taraba State

Source Taraba Wikipedia

1.2 Socio-demographic overview

Taraba State has 16 local government areas (LGAs), zoned into three senatorial districts. The state is multi-ethnic with occasional communal unrests. Recent insecurity insurgence in the north-eastern region is causing

a mass influx of people from the neighbouring states (DHS 2013; NTBLCP 2015).

1.3 Socio-economic overview

Nigeria is a lower-middle income country and has a gross domestic product (GDP) of $262.6 billion and a GINI index of 0.29 (DHS 2013). Over 70% of Nigerians are living on less than one US dollar per day, and very few are extremely rich while majority of the population are poor (Collier & Pattillo 2008). There is a high level of poverty and weak infrastructure in the country, especially in the entire north-eastern region where Taraba State is situated (DHS 2013; NTBLCP 2015). There is high rate of unemployment in the country and is reflected in the state (National Bureau for Statistics 2011; DHS 2013), where over 80% of the population are sustenance farmers and small scale traders with a lot of problems facing their practice such as; lack of access to farm inputs, lack of storage facilities and lack of funds for expansion (Okuneye 2002). People working in the formal sector live mostly in the state capital and the local government headquarters. There is a poor road network within the state and some settlements are unreachable during the rainy season (DHS 2013).

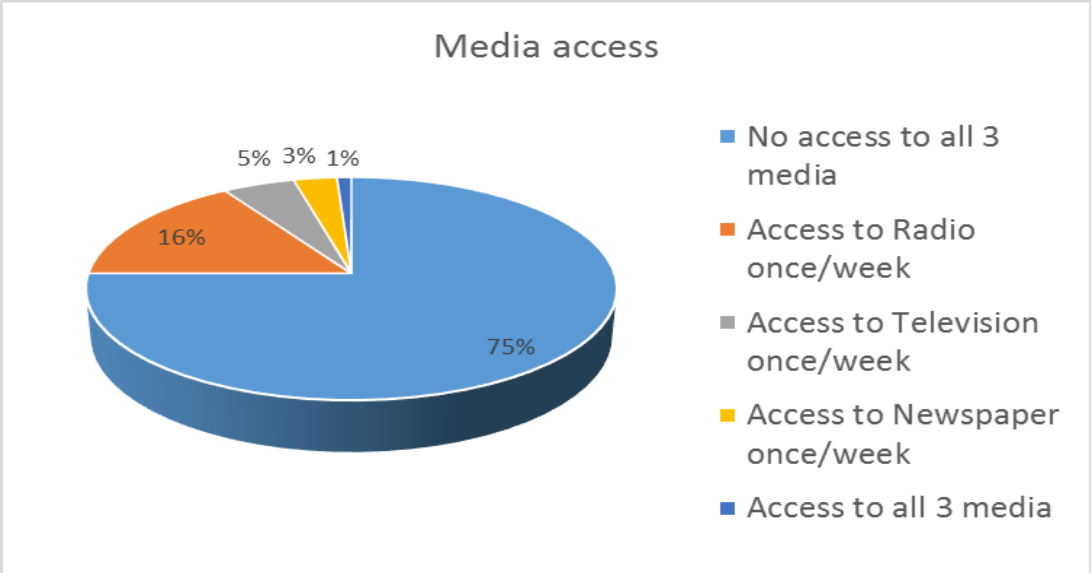
According to the same report (DHS), access to media in the state is poor. 75% have no access to all the three media types (newspaper, radio and television). Only 16% have access to radio, 5% to television and 3% to newspapers at least once in a week. While only 1% have access to all three media at least once in a week. Proportion of the population access to media is presented in figure 2 below.

1.4 Health status

Nigeria still has health indicators that are far from reaching international targets such as the Millennium Development Goals (MDG) goals as presented in annex 1 (WHO 2014b). Similarly, Taraba State has poor

health indicators and in some cases, worse. For example, as mentioned previously, the higher state HIV prevalence. Lastly, it is located in the north eastern region of Nigeria with the worst health indicators among the six geopolitical zones (DHS 2013).

Figure 2: Media access in Taraba State



Source DHS 2013

1.5 Health system and financing

The Nigerian national health care system is built on the basis of the three-tier responsibilities of the federal, state and local Government. The primary, secondary and tertiary levels of care are the responsibility of the local, state and federal government respectively (FMOH 2004). The Federal Ministry of Health (FMOH) formulates health policies in consultation with the state and local government through multi-sectorial inputs, community involvement and collaboration with non-governmental health care providers (FMOH 2004).

High out of pocket payments is the major source of financing in Nigeria (WHO 2014b). This means TB/HIV patients have to pay for other health

care services at the service delivery point which may limit access to quality health care (NSHDP 2009), and there is no adequate insurance coverage in the country (Dutta & Hongoro 2013).

Taraba State operates her health policy within the context of the Nigerian National Health system. There are two tertiary health facilities in the state capitals; one federal medical centre (FMC) and one State Specialist Hospital (SSH), thirteen secondary public facilities spread across the state, 895 Public Primary Health Centres (PHC), 135 private for-profit primary facilities and 13 private for- profit secondary health facilities in the state. One Non-Governmental Organization (NGO) health facility located in the Mambilla Plateau provides comprehensive TB/HIV care (Taraba State Ministry of Health 2012). And the secondary health facilities are located in the LGA headquarters.

1.6 Tuberculosis and HIV control programme

The Tuberculosis and Leprosy control programme is in the department of Public Health of the Ministry of Health. The programme is headed by a State Tuberculosis and Leprosy control officer (STBLCO). The STBLCO is supported by supervisors and Local government Tuberculosis and leprosy supervisors (LGTBLS) in coordinating the activities in the state. The LGTBLS coordinate the TBL activities in their respective LGA and report quarterly to the STBLCO and the STBLCO summarizes the quarterly reports and submit same to the national tuberculosis and leprosy control programme (NTBLCP) in Abuja. An organogram of the NTBLCP is presented in annex 2 (NTBLCP 2014a; TTBLCP 2014). Similarly, according to the national agency for control of AIDS (NACA) guidelines in Nigeria, HIV intervention programmes such as HIV counselling and testing (HCT), antiretroviral therapy (ART) and prevention of mother to child transmission

(PMTCT) are coordinated in the state by a programme manager under the same department of the Ministry of Health with a focal officer in each of the LGAs that report monthly to the SMOH through the programme manager (NACA 2009).

1.7 Brief epidemiology of TB and TB/HIV

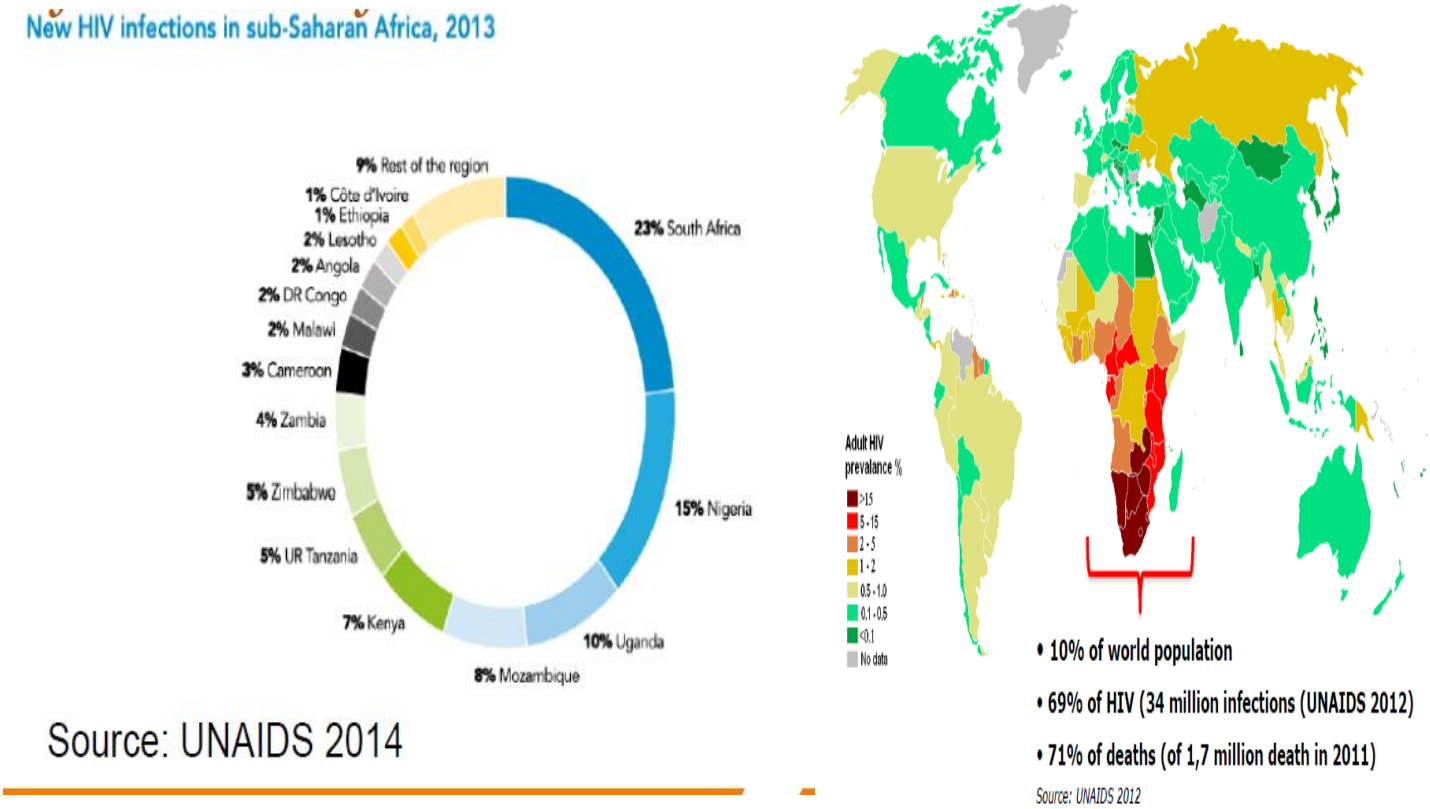
Tuberculosis is a chronic bacterial infection caused by Mycobacterium tuberculosis which can affect multiple organ systems in the body. The most affected organ is the lung (over 80% of cases). The disease is spread from person to person through air droplets (WHO 2014a). On the other hand, HIV is a viral infection that destroys the immune (defense) system of the infected individuals and predisposes to opportunistic infections including TB. HIV is transmitted from infected individual to uninfected individual through unprotected penetrative sex, sharing of sharp needles or blades, transfusion of infected blood, and from infected mother to baby during pregnancy, delivery, or breastfeeding (WHO 2014a; NTBLCP 2014a). The commonest route of transmission in Nigeria is heterosexual sexual intercourse (NTBLCP 2014a; NACA 2009). Poverty, unemployment and low socioeconomic status are the main drivers of TB/HIV epidemic in Nigeria (NTBLCP 2015; NACA 2014) which is similar in South Africa (Harling et al. 2008) and other countries (WHO 2010). HIV fuels the TB epidemic in the immunocompromised population and TB is the commonest cause of death among PLHIV (Schutz & Pozniak et al 2010).

HIV and TB are the leading cause of mortality due to infectious diseases globally (WHO, 2014a). Over nine million cases of TB were estimated globally in 2013 and 1-1.2 million (11-14%) were among people living with HIV (PLHIV). Africa has the highest TB/HIV co-infection rate of 34%, which accounts for 78% of TB cases among PLHIV globally. According to the

same report, Nigeria and India account for one -third of global TB deaths. Most African countries including Nigeria are unlikely to meet the MDG of halving their TB burden in 2015 with reference to 1990 data (WHO 2014a). Furthermore, TB and HIV have also been reported to be a major cause of non-obstetric maternal deaths in sub-Saharan Africa (Grange et al. 2010). Similarly, low cure rate and high defaulter rate have been reported among TB/HIV co-infected pregnant women in Nigeria (Wasiu et al. 2011).

Nigeria is one of the 22 high TB burden countries (HBC) world-wide with a TB prevalence rate of 318/100,000 population (NTBLCP 2012). The national case detection rate (CDR) is just 16% (95% CI; 11-28) and the state CDR was 18% in 2013 (WHO 2014a; TBLCP 2014). The National HIV prevalence among adult population is 3.5%, but in Taraba State the prevalence rate is 10.5% (NARHS 2013). The most affected population age groups for both diseases from the beginning of the epidemics to date is between 25-45 years which is the reproductive age group (Roberts & Harries 1989; WHO 2014a). Nigeria contributes 15% of the new HIV infection in Sub Saharan African region as presented in figure 3 below (UNAIDS 2013). The National TB/HIV co-infection rate in Nigeria as reported in 2013 was 23% (NTBLCP 2014a). The TB/HIV co-infection rate for Taraba State was 30% in 2013 and the DR among the co-infected patients has being on increase (TTBLCP 2014).

Figure 3: World map showing HIV burdens and sub-Sahara African contributions



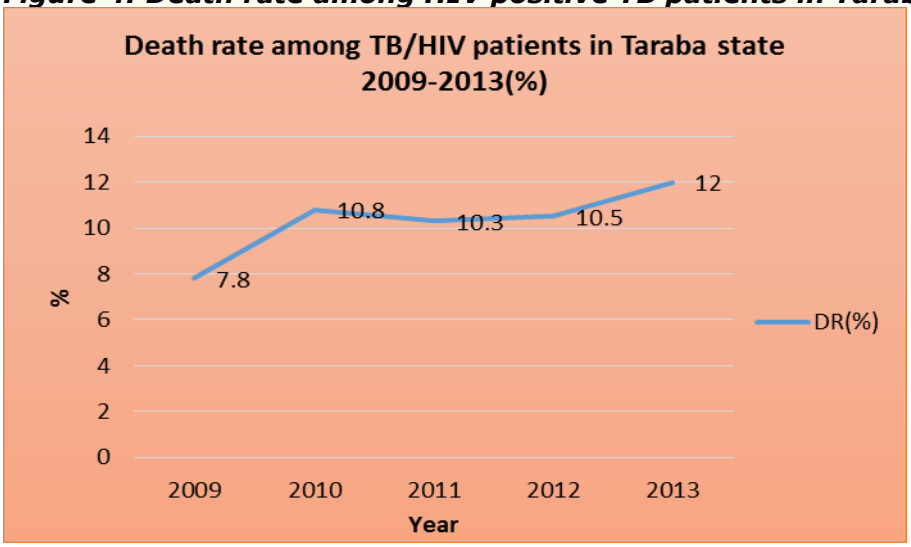
Chapter 2: PROBLEM STATEMENT, JUSTIFICATION, OBJECTIVES AND METHODOLOGY

This chapter describes the problem statement, justification, objectives and methodology of the study. The conceptual framework used in the analysis of this work is also presented.

2.1 PROBLEM STATEMENT AND JUSTIFICATION

There is a high death rate (DR) among TB/HIV co-infected patients receiving TB treatment in Taraba State (TTBLCP 2014). Despite ongoing TB/HIV collaborative activities in the state, the DR among TB/HIV co-infected patients has been on an increasing trend over the past 4 years; from 7.8% in 2009 to 12% in 2013 as presented in figure 4 (TTBLCP 2014). This is way beyond the WHO limit of <5% (WHO, 2014a).

Figure 4: Death rate among HIV positive TB patients in Taraba State 2008-2013



Source: TTBLCP, 2014

Based on the high DR among detected TB cases in HIV patients, it is plausible to project that the DR among undetected TB cases with possible TB/HIV co-infection in the state might be higher (TTBLCP 2014). In spite of

the high burden of TB and TB/HIV co-infection in the state, no study has been done to analyze the factors influencing the outcome of TB treatment among the TB/HIV co-infected patients. In addition, the influence of TB/HIV collaborative activities such as antiretroviral therapy (ART) and cotrimoxazole prophylactic therapy (CPT) on treatment outcomes in TB/HIV co-infected patients in Taraba State has not been analyzed. Hence the need to focus this study on exploring factors that influence the outcome of TB treatment among the TB/HIV groups so that identifying and addressing these factors might reduce the mortality rate thereby improving the health of the reproductive age groups that are mostly affected as stated earlier. This will further contribute positively to the socioeconomic growth of the state. Reducing the DR of TB/HIV patients receiving TB treatment will also increase the confidence of the populace on the health system of the state and might improve the health seeking behavior and TB CDR in the state, and thereby contributing to a reduction in the impacts of these diseases.

2.2 Objective

2.2.1 General objective

The overall objective is to explore factors influencing TB treatment outcomes and mortality among TB/HIV patients in Taraba State (North East Nigeria) in order to make recommendations to reduce the mortality among PLHIV with TB co-infection.

2.2.2 Specific objectives

1. To analyze current TB treatment outcomes, including mortality, among TB/HIV patients in Taraba State
2. To identify factors influencing TB treatment outcomes including mortality among TB/HIV patients.

3. To identify level and gaps of interventions in areas of TB/HIV collaborative activities in Taraba State
4. To make recommendations to relevant stakeholders in order to enhance good treatment outcomes and reduce mortality in HIV co-infected TB patients

2.3 Methodology

2.3.1 Study design

Secondary TB data analysis was used to address the first objective of this study. TB treatment registers was used from the state TBLCP excluding the names of the patients with the permission of the programme manager. The unit of analysis are the registered TB patients in between 1st January 2013 and 31st December 2013 in all the LGA registers. In addition, a literature review was carried out in order to address other objectives.

Microsoft Excel and EPI Info™7 was used to analyze the cohort of TB patients using 2x2 table to calculate risk and Chi square. A data extraction form was used to record the narrations from reviewed articles according to the themes of the conceptual framework. A limitation of the data collection was due to data saturation.

2.3.2 Search strategy

Published and unpublished articles (peer-reviewed and grey literature) related to TB/HIV treatment outcomes were obtained from databases (Web of science and PubMed), search engines (Google scholar), relevant institutional websites (FMOH, WHO and World Bank). In addition, unpublished data from the NTBLCP, FMOH, SMOH and the Taraba State TBLCP were reviewed. Articles and publications reviewed were restricted to

those written in English language. Articles published before 2005 were excluded except when found to be relevant to the study topic.

2.3.3 Key words

The following key words were used; Tuberculosis, HIV and "Treatment outcome." These key words were used in combinations with other terms as related to my study title and framework terms as presented in table 1 below.

Table 1: Search table

Source	Objective 1	Objective 2	Objective 3	Objective 4
PubMed		Tuberculosis AND HIV AND 'treatment outcome', Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria AND 'patient factors	Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria	
Google scholar		Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria AND 'Health system', Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria AND 'Health system factors', Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria AND 'patient factors, TB/HIV AND diabete AND Nigeria	Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria	
Web of Science		Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria AND 'Health system', Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria AND 'Health system factors'	Tuberculosis AND HIV AND 'treatment outcome' AND Nigeria	
Institutional websites(WHO, NTBLCP, FMOH)	Taraba TB data set 2013		TB/HIV AND collaborative ,	TB/HIV AND collaborative ,

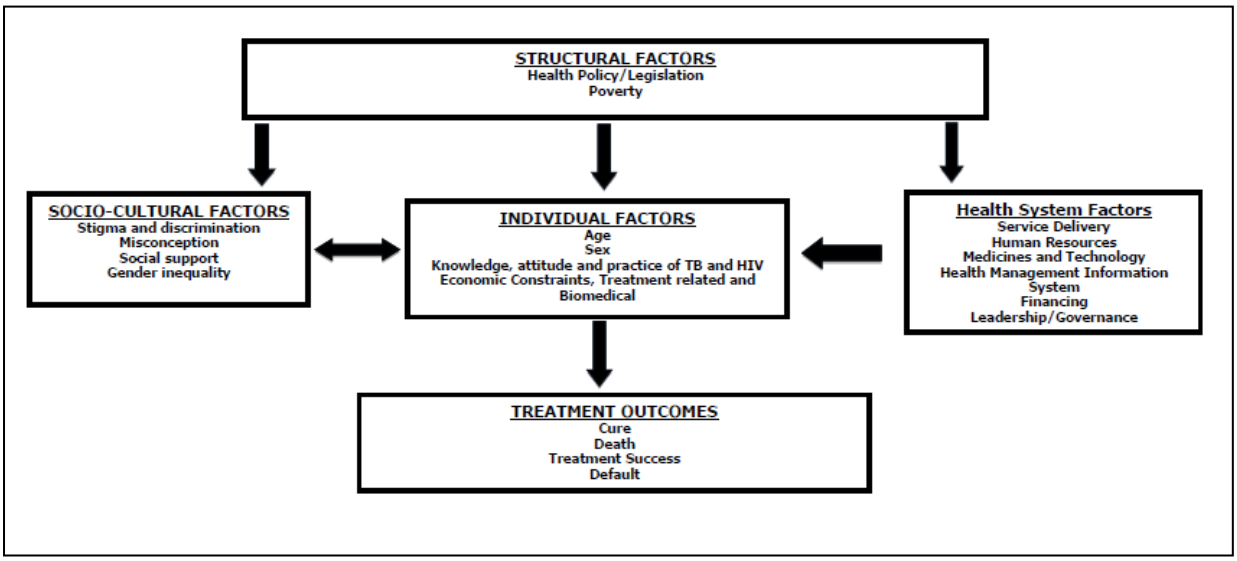
Articles were sorted according to study title and subtitle, those that were not relevant were excluded from the review.

2.3.4 Conceptual framework

The social-ecological conceptual framework was adapted from a study done by Roura et al. (2009) in Tanzania on ART adherence and this was used to analyze factors influencing treatment outcomes among TB/HIV co-infected patients. This framework was chosen because it provides a dynamic approach to analyzing the interaction between the individual and other factors (such as social, structural and programmatic). It emphasizes the multilevel interaction between these factors and the principle that outcomes are not based solely on a factor but as a result of interplay between these factors (Roura et al. 2009).

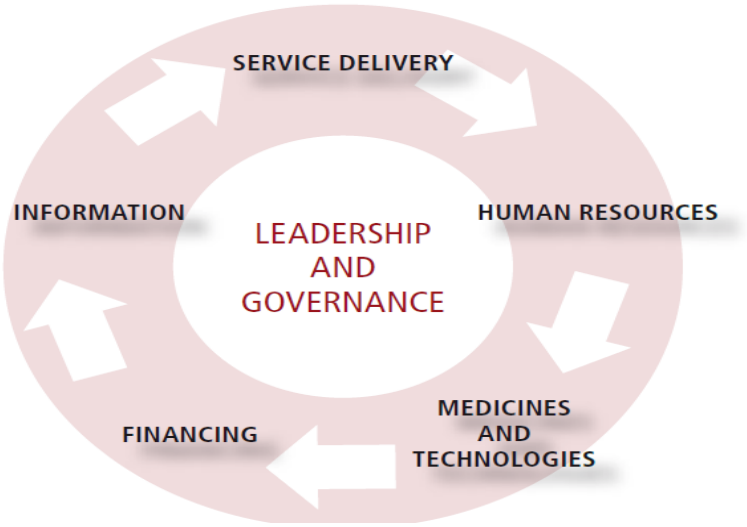
The original framework did not explore the role of health system factors; thus, the health system factors (WHO health system building blocks- service delivery, workforce, information, Medicines and technologies, financing and leadership/governance) were added to the adapted framework (WHO 2007). The adapted framework is presented in figure 5 below and the WHO Health system building blocks framework is in figure 6.

Figure 5: Adapted socio-ecological conceptual framework for TB/HIV treatment outcomes



Source: **Roura et al. 2009; WHO 2007**

Figure 6: WHO health system building blocks



Source: WHO 2007

2.3.5 Limitation of the conceptual framework

The adapted framework adequately addressed the objectives of my study.

Chapter 3: FINDINGS FROM TARABA STATE AND NIGERIA

Chapter 3 describes the findings from the analysis of Taraba State TB/HIV treatment registers in 2013 and literature findings according to the conceptual framework described in chapter 2 in Nigeria and Taraba.

3.1 TB situation in Taraba State

3025 TB patients were registered in the state between 1st January and 31st December 2013 (TTBLCP, 2013). Age distributions of the reported TB cases in the state was 4% under 15 years, 90.3% were 15-65 years.
Summary of findings are presented in Table 2 below.

Table 2: Summary of findings from Taraba State TB data 2013

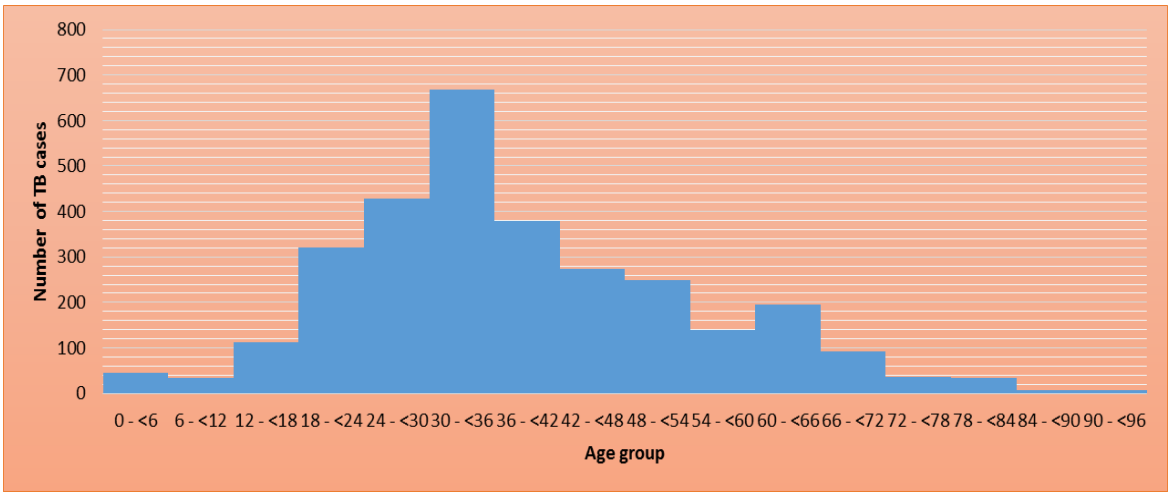
SUMMARY OF FINDINGS FROM TB REGISTER TARABA STATE 2013							
S/N	**INDICATORS**	**HIV NEGATIVE (=n)**	**HIV NEGATIVE (%)**	**HIV POSITIVE (=n)**	**HIV POSITIVE (%)**	**TOTAL**	**P-value**
1	Total TB patients registered in 2013					3025	
2	Total TB patients tested for HIV in 2013					2786	
3	Total TB patients with HIV results	1959		827		2786	
4	Median Age of TB patients(years)	36		34			
5	Average age of TB patients	38		35			
6	Modal age of TB patients	30		30			
7	Female proportion of TB/HIV patients				51.6		
8	Male proportion of TB/HIV patients				48.4		
9	Proportion of smear positive TB patients	1198	78.60	325	21.3	1523	
10	Cure rate	932	82.30	219	69.3	1151	<0.001
11	Treatment success rate		90.4		81.0		
12	Death rate	122	6.2	100	12.0	222	<0.001
13	Proportion of Death among smear Negative		41.0		58.0		
14	Proportion of Death among smear positive		54.1		40.0		
15	DR among TB/HIV on ART			45	13.1	343	0.47
16	DR among TB/HIV no ART			55	11.4	484	0.47
17	DR among TB/HIV on CPT			76	12.7	601	0.43
18	DR among TB/HIV not on CPT			24	10.6	226	0.43

19	CR among TB/HIV on ART			96	68.6%	140	0.97
20	CR among TB/HIV no ART			121	68.8%	176	0.97
21	CR among TB/HIV on CPT			144	68.9%	209	0.899
22	CR among TB/HIV no CPT			73	68.2%	107	0.899
23	Proportion of TB/HIV patients on ART			343	41.5%	827	
24	Proportion of TB/HIV patients on CPT			601	72.7%	827	

From TTBLCP, 2013

The age distribution of the TB cases is presented in figure 7. Male/female ratio of all the TB cases was 0.9. The age and sex distribution is similar to the global reports of 6% under 15 years and male/female ratio of 0.7-2.9 (WHO 2014a).

Figure 7: Age distribution of TB cases in Taraba State 2013

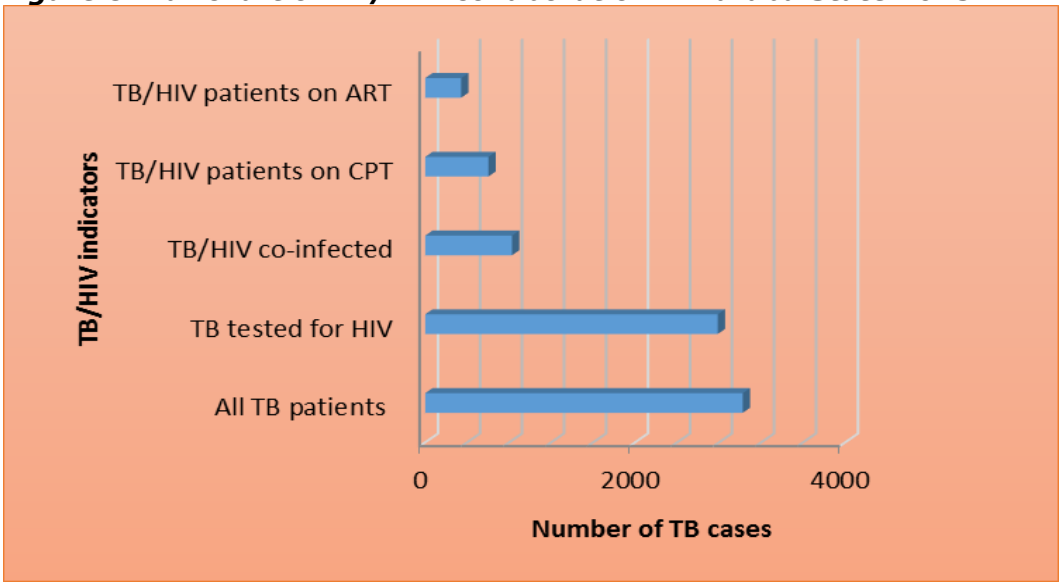


Source: TTBLCP 2013

2786/3025 (92%) were tested for HIV. This finding (92% HCT uptake) is higher than the global average, African regional and Nigerian national reports of 48%, 76% and 87% respectively but lower than the WHO target of 100% (WHO, 2014a). 8% (239/3025) were not tested for HIV in spite of available HCT services in all the LGAs in Taraba State. 827/2786 (29.7%)

were co-infected with HIV as shown on figure 8 below, higher than the national rate of 23% (NTBLCP 2014a). The high co-infection rate is similar to study conducted in Benin of Nigeria reported 33.9%(Affusim et al. 2012)

Figure 8: Bar chart of TB/HIV collaboration in Taraba State 2013



From TTBLCP 2013

41.5% and 72.7% of known TB/HIV co-infected patients were placed on ART and CPT respectively. The ART and CPT coverage rate is below the WHO target of 100% despite documented benefits in global reports and other researches (WHO, 2014a).

The DR among HIV-positive and HIV-negative TB patients was 12% and 6.2% respectively and the risk ratio of 1.9 (95% confidence interval (CI); 1.5-2.5; $p<0.001$). DR among TB/HIV co-infected placed on ART and those not on ART was 13.1% and 11.4% respectively and risk ratio of 1.2 (95% CI; 0.8-1.6; $p=0.47$). Also, DR among TB/HIV co-infected placed on CPT and those not on CPT was 12.6% and 10.6% respectively and risk ratio of 1.2 (95% CI; 0.8-1.8; $p=0.43$). There is no statistical association in DR among HIV positive TB patients on ART/CPT and those not on ART/CPT.

Details of statistical table is in annex 3. Of the HIV positive TB deaths, 55% occurred in female, while among HIV negative TB deaths, 30% occurred in female. The risk of female TB/HIV patients dying is 1.2 compare to male HIV positive TB patients (95% CI; 0.7-1.6; p=0.54). 2%, 74%, and 24% of the deaths occurred in the ≤15 years, 16-40 years and >40 years group respectively in 2013. The reproductive age groups are the worst affected.

The cure rate (CR) among HIV-positive and HIV-negative TB patients was 69.3% and 82.3% respectively with risk ratio of 0.8 (95% CI; 0.78-0.9; p<0.001). This is statistically significant and similar to other findings in Nigeria (Huldah & Kelechukwu 2015; Odume & Njepuome 2009). CR among TB/HIV co-infected placed on ART and those not on ART was similar 68.6% and 68.8% respectively. And the CR among those placed on CPT and those not on CPT was 68.9% and 68.2% respectively with risk ratio of 0.9 (95% CL; 0.86-1.14; p=0.899). Treatment success rate (TSR) among the TB/HIV co-infected and HIV negative TB patients was 81% and 90.4% respectively. The gap in TSR between HIV positive and HIV negative TB patients is similar to the global reports (WHO 2014a) and other studies in Nigeria (Ebonyi State), Cameroun, Togo, Vietnam and India (Oshi & Ukwaja 2014; Odume & Njepuome 2009). 73.3% of TB/HIV patients received treatment with the support of treatment supporters (TS) while 80% of HIV negative TB patients were supported by TS. Overall, 83.1% (2,516 of 3,025) of all registered TB patients in 2013 in the state received treatment with the help of a treatment supporters.

3.2 Factors influencing TB/HIV treatment outcomes

3.2.1 Structural and policy factors

Policy and Legislation

The Nigerian National Health bill was passed in the National House of assembly in 2014 (FMOH 2014). Preceding this, the anti-stigmatization and discrimination bill was also been passed by the national assembly and some states but awareness of this bills among stakeholders like the judiciary, the police and the general public is still low (NACA 2014). However, the anti-stigmatization bill has not been passed in Taraba State as in conversation with A. Johnson, PLHIV (July 2015).

In the NACA report, (2014), TB/HIV Management guidelines has been updated and in use since 2010 (to place all HIV positive patients with active TB on ART irrespective of their CD4 counts concurrently with TB treatment) but the national compliance by clinicians is suboptimal (NACA 2014; NTBLCP 2014a).

Nigeria is implementing the WHO 'STOP TB STRATEGY' and by extension Taraba State (WHO 2014a). In Nigeria only multi-drug resistant TB (MDR TB) patients are given transport and feeding allowances while on treatment (NTBLCP 2015; TTBLCP 2014).

Criminalization of same-sex relations in Nigeria and the death sentence in northern Sharia state of Nigeria and the influence of this criminalized group on TB/HIV outcomes has not been studied in Taraba State (NTBLCP 2014b & 2015).

Poverty

Poverty and poor health infrastructure of the state is worsened by the occasional communal clashes and the insecurity insurgence in the North Eastern region (DHS 2013; NTBLCP 2015). Though there are no official records of internally displaced people in the state, it is obvious that there

are mass movements into the state from the troubled states of Borno, Yobe and Adamawa for safety. In a survey conducted in rural community in south eastern Nigeria, over 65% of the houses were overcrowded and promoting the spread of respiratory diseases including TB (Anochie et al. 2013). And the risk of infection is higher in high HIV prevalence population like Taraba State (NARHS 2013). Poor living and working environments have been reported as drivers for TB/HIV epidemic in Nigeria (NTBLCP 2015; NACA 2014) which is similar to findings in South Africa (Harling et al. 2008) and Africa (Lönnroth et al. 2009).

Poverty has interaction with other factors such as distance from facility, lack of money can constitute financial barrier to health care as reported by some studies in Nigeria and Sub-Saharan Africa (Finnie et al. 2011; Ukwaja et al. 2013). Similarly, lower socioeconomic class have been associated with higher incidence of TB especially in the presence of HIV and are also having poor access to TB/HIV care in poor countries (WHO, 2010).

3.2.2 Individual related factors

Age

AS presented above the highest prevalence of TB/HIV occurs in the reproductive age group and similarly highest DR among the TB/HIV occurred in the same age group in Taraba State and Nigeria (TTBLCP 2013; NTBLCP 2014b).

Sex

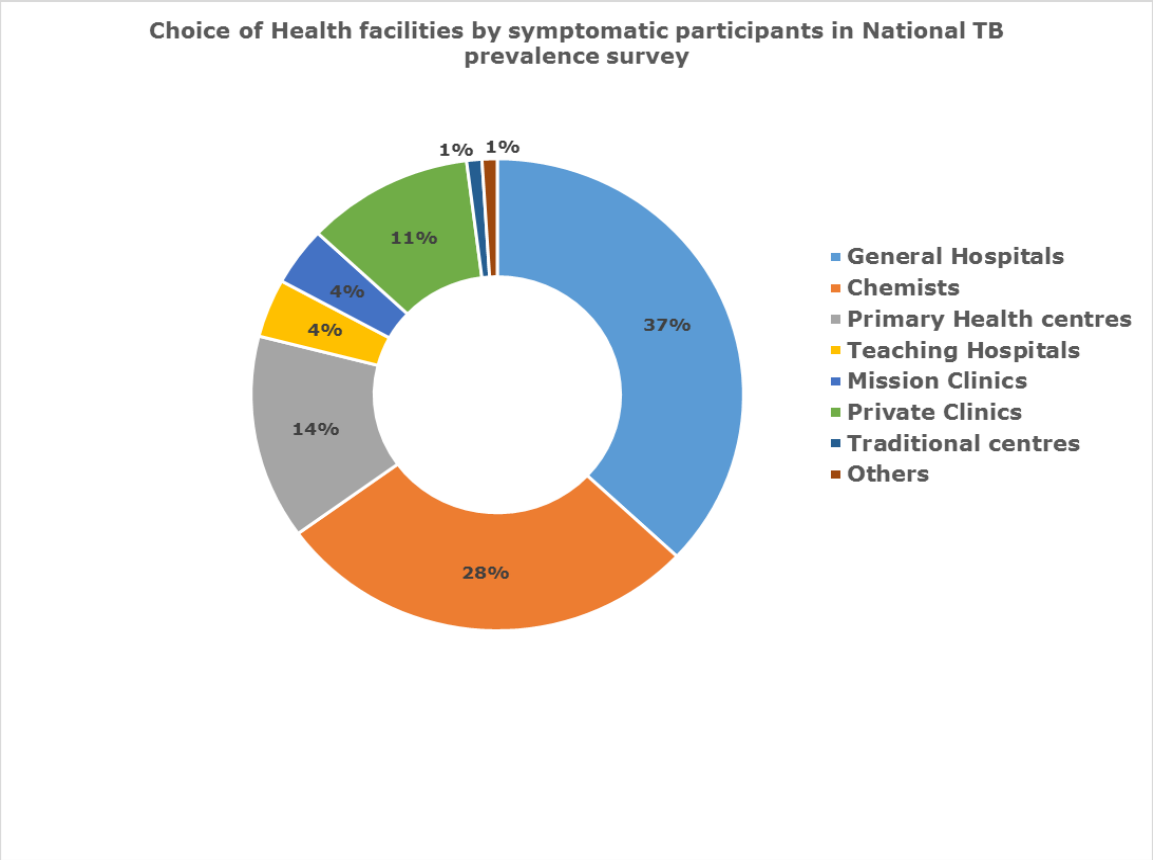
Female have higher prevalence rate and death rates among TB/HIV patients in Taraba which is similar to global reports (TTBLCP 2013; WHO 2014a) and a study conducted in South Africa reported (Zwang et al. 2007).

Knowledge, attitude and practice about TB/HIV diseases

A lack of correct information about the causes, symptoms and spread of TB diseases has been reported by the NTBLCP (2015). Findings from this study indicate that late presentation of TB cases at the facility level may contribute to poor treatment outcomes (NTBLCP 2015). In cross-sectional study done in Nigeria, 53.1% of the study participants were reported to believe that TB patients are promiscuous (Anochie et al. 2013). Furthermore, they were of the idea that malnutrition and HIV/AIDs are major routes of TB transmission, and over 50% were not aware of free directly observed treatment short course (DOTs) programmes in their locality (Anochie et al. 2013). And when informed, over 50% were not willing to take TB and HIV test despite the fact they were free of charge (Anochie et al. 2013).

According to the national TB prevalence survey report in Nigeria, 24% of the symptomatic participants did not take any action of seeking for care and 28% took self-treatment while only 46% consulted health services. Of those that consulted health services, the majority consulted general hospitals (37%), chemists (28%), primary health centres (14%) and private hospitals (11%) as presented in figure 9 below (NTBLCP, 2012). However, this choice of facilities was not disaggregated into HIV positive and HIV negative symptomatic participants. It could reflect the general practice of the population. The PHC, which is supposed to be the entry point into health service was not patronized according to this report. Though the reasons for the low patronage of PHC are not stated, it could be attributed to loss of confidence in PHC due to infrastructural (both structural and human) decay perceived quality of care by the participant.

Figure 9: Choice of health facilities by symptomatic TB participants during prevalence survey in Nigeria, 2012



Source: NTBLCP, 2012

Economic constraints

The TB register did not capture data on socioeconomic status of the TB/HIV patients receiving treatment in Taraba. So it is difficult to analyze the effect of socioeconomic class on TB treatment outcome (TTBLCP 2013). Nevertheless, some studies have reported poor treatment outcomes in Nigeria due to lack of money for transportation cost to facility for TB/HIV care (Ukwaia et al. 2014). Some families in Benin City of Nigeria spend more than their income to access TB/HIV care on transportation and

feeding costs. This will affect other needs of the family and push them more into poverty or interrupt treatment (Sadoh & Oviawe 2007).

Treatment and biomedical related factors

Late presentation and ART initiation

Alobu et al. (2014), reported late presentation of TB/HIV patients at the facility especially among the poor residents of slums and rural areas that are associated with higher mortality (Alobu et al. 2014).

Current TB treatment register do not capture CD4 cell count and viral load that can be used to analyze the stage of PLHIV presenting at diagnosis for TB. No study has been conducted in Taraba state to ascertain the stages of TB/HIV patients on presentation. However, many researchers have reported late presentation to have contributed to high mortality among TB/HIV co-infected patients in sub Saharan African region (Agbor et al. 2010; Worodria et al. 2011; Belayneh et al. 2015).

Adverse drug reaction

Data on adverse drug reactions among HIV positive TB patients is poor in Nigeria (Nwokike 2008). And the current TB treatment register did not capture adverse drug reaction (NTBLCP 2014a; TTBLCP 2013).

Biomedical related factors

Comorbidity

The reported high prevalence of depressive disorders among TB patients in Nigeria (Issa et al. 2009), is similar to findings in Ethiopia (Deribew et al, 2010). However, the prevalence of other comorbidity like diabetes mellitus, hypertension and substance abuse among TB/HIV in Nigeria and Taraba is not known (NTBLCP 2014b; TTBLCP 2014).

Disease type and severity

In Taraba State 15 new cases of MDR-TB were notified in 2014 (TTBLCP 2014). However, the prevalence of HIV among the MDR-TB patients were not reported. Some studies reported higher mortality rates among smear negative, extra pulmonary TB (EPTB) and disseminated TB patients than the smear positive TB patients and this gap is widened in HIV positive TB patients and the risk of developing MDR-TB is higher among HIV-positive TB patients (Alobu et al. 2014; WHO 2014a).

Pregnancy

No study in Taraba has been reported of the effect of pregnancy on TB/HIV treatment outcome. However, a study in South western Nigeria has reported low cure rates and high defaulter rates among TB/HIV co-infected pregnant women (Wasiu et al. 2011). Similarly, high maternal mortality has been reported among TB/HIV co-infected pregnant women in South Africa (Khan et al. 2001).

Nutritional Status

No study is found on the effect of nutrition on TB/HIV treatment outcome in Taraba state and Nigeria. However, the influence of malnutrition on mortality among TB/HIV co-infected patients have been reported in other countries with high burden of TB/HIV co-infection such as Tanzania (Jeremiah et al. 2014) and Malawi (Zachariah et al. 2014). Nutritional assessment is not part of TB/HIV interventions in Nigeria and data on the effects of nutrition on TB/HIV treatment outcome is scarce (NTBLCP 2015; NACA 2014).

3.2.3 Sociocultural factors

Stigma and discrimination

Fear of stigma and discrimination by family members and the community have been reported by the NTBLCP to contribute to late presentation of TB patients at facility for care and also low HCT uptake by the general population in Nigeria and Taraba State in particular (NTBLCP 2015; NACA 2014). This high double stigma is due to misconception that TB and HIV are punishment from gods (NTBLCP 2015). In a cross-sectional study conducted in a rural community in south eastern Nigeria on the level of public TB awareness, 93.8% of the study participants reported stigma against TB patients (Anochie et al. 2013), which is similar to findings of a qualitative study conducted in South Africa where dual infection (TB/HIV) is associated with a unique form of social stigmatization (Daftary 2012), and in Zambia, TB/HIV co-infections were reported with deepening stigma by Chileshe and Bond (2010). There is no robust data on the influence of stigma on TB treatment outcome among TB/HIV co-infected patients in Taraba and Nigeria (NTBLCP 2015; TTBLCP 2014).

Misconceptions

The NTBLCP reported high misconception that HIV and TB are punishment form gods by Nigerian population (NTBLCP 2015; TTBLCP 2014). Anochie et al. (2013) in a study conducted in south eastern Nigeria reported a high proportion of misconception that TB patients are promiscuous among study participants.

Social support

There is lack of study in Taraba State on the influence of social support on TB treatment outcome among TB/HIV co-infected patients

Gender inequality

No data on effects of gender on influence of gender inequality on TB treatment outcomes among HIV patients. However, some studies from Zambia and South Africa reported the influence gender inequality on treatment outcomes among TB/HIV patients (Daftary 2012; Chileshe & Bond 2010).

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3.2.4 Health system related factors

Service delivery

From the literature review, service delivery in TB/HIV treatment is presented under; TB/HIV collaborative activities, TB/HIV integration and quality of care.

TB/HIV collaborative activities

Taraba State has a directly observed treatment short course (DOTs) facility to population ratio of 1:33,000 as against the WHO and NTBLCP target of 1:25,000. and a diagnostic facility population ratio of 1:62,000 as against 1:50,000 target (TBLCP 2014; NTBLCP 2014a & 2015; WHO 2013a & 2014a). Similarly there are 80 and 23 facilities providing HCT/PMTCT and ART services in the state as presented in table 3 below (TSMOH 2014). As stated above, TB/HIV collaborative activities are implemented across the state. It is expected that all TB patients are offered HCT at the DOTs clinic and all HIV positive patients enrolled at ART units are screened for TB (NACA 2009; NTBLCP 2014b). There was low proportion of population enrollment for HCT in 2013 in Nigeria (NACA 2014).

Overall, Taraba State is implementing TB control activities according to the "Stop TB strategy" adopted by the NTBLCP and the level of implementation and the Stop TB Strategy Components is presented in in annex 4 (TTBLCP

2014; WHO 2014a). The state started TB/HIV collaborative activities in 2008 (TTBLCP 2014). The components and level of implementation of TB/HIV collaborative activities in the state are also presented in annex 4.

Table 3: Number of facilities providing HCT, PMTCT & ART in Taraba 2013/2014

Data Element	Year 2013	Year 2014
HCT	57	80
PMTCT	57	80
ART	20	23

Source: TSMOH, 2014

Lack of ART initiation and poor TB/HIV collaborative activities especially in rural areas have been reported to contribute to increased mortality among TB/HIV patients in Ebonyi (Oshi et al. 2014) and Gombe States of Nigeria (Odume & Njepuome 2009).

Integration of services and task shifting

In Nigeria and Taraba in particular TB and HIV care are vertically integrated (separate reporting system different from the national health management information system) into the health system, however the comprehensive HIV care including ART are in secondary and tertiary facilities and where they collocate within the same facility, they are run by separate staff at different clinic schedules (NTBLCP 2015; NACA 2014; TTBLCP 2014). And there is no task shifting in the Nigeria human resources for health (HRH) plan despite high burdens of TB/HIV on a weak health system (NSHDP 2009).

Quality of care

Information about TB/HIV management is part of the packages for training of GHWs on TB/HIV collaborative management (NTBLCP 2014a). How correctly and completely this information reaches patients depends on the skills of the GHWs and also the understanding of individual patients (Goudge et al. 2009). Quality of care to TB/HIV patients has not been studied in Taraba State and national data on this aspect is scanty (NTBLCP 2014b & 2015; TTBLCP 2014).

Human Resources for Health (HRH).

General HRH for Nigeria and Taraba State

Nigeria is one of the most affected countries in the World and the worst in Africa in terms of health HRH crisis with a skilled professional proportion of less than 34.5/100,000 in spite of the increasing burden of TB and HIV on the health system (WHO 2015). The human resources for health (HRH) data available in Nigeria and Taraba State for 2005 is presented in table 4 below.

Table 4: HRH data for Nigeria and Taraba State 2005

Staff type	**National Data**		**Taraba State**	
	Number of staff	**Number of staff/100,000 population.**	**Number of staff**	**Number of staff/100,000 population.**
Doctors	39,210	30	89	4
Nurses	124,629	100	506	22
Lab scientists	12,860	12	7	0.3
Pharmacists	12,072	11	38	2
Community Health practitioners	117,568	19	411	18
Environmental Health officers	3,441	3	N/A	
Health record officers	820	0.66	N/A	

Source: **FMOH, 2007**

The challenges of HRH management in Nigeria were identified as; the lack of coordination and harmonization of HRH needs at all levels, dearth of skills, poor motivation, differential conditions of service, poor remuneration, poor work environment, negative attitudes to work and poor supervision (FMOH 2007). And there is inequitable distribution of HRH to the disadvantage of lower level of care, rural areas, and the northern part of Nigeria to which Taraba State belongs. There is also a high rate of HRH migration to United States and United Kingdom such that the products of many training institutions in the country cannot meet the HRH needs (FMOH 2007). There is a relatively higher proportion of nurses and community health workers than doctors, pharmacists and laboratory scientists at both the national and state levels. This may be due to the presence of colleges of nursing and health technology for training of nurses and CHWs respectively in the state (FMOH 2007).

HRH for TB/HIV

The details records of HRH in the TB control programme at the national level in most HBCs including Nigeria is inadequate (Figueroa-Munoz et al. 2005). The quality of care being provided by HWs trained on TB/HIV control programme in Nigeria is not being followed (Awofeso et al. 2008).

In Taraba, only 22 secondary and 2 tertiary health facilities provide comprehensive ART care and the TB clinics are run separately (TBLCP 2014; TSMOH 2012). TB services are equally below the HF to population ratio and in the midst of high TB/HIV burden, the few staff may be overworked and compromised quality of care (Awofeso et al. 2008; TTBLCP 2014). Budgetary allocation for training and follow up of the trained workers in the management TB/HIV is grossly inadequate both by government and partners (Awofeso et al. 2008). Malawi having high TB/HIV burden as Nigeria has similar HRH challenges as Nigeria which has

been reported to affect quality of care for TB/HIV patients in the country (Harries et al. 2005).

The prevalence of TB/HIV among health workers in Taraba and Nigeria and how this contribute to HRH shortage is not known. However, high rate of TB and HIV infections among health workers which affected the already limited number of HRH for TB/HIV care in South Africa and causes migration of HRH from TB/HIV programme has been reported by a study done in the country (Karim et al. 2009). In the same study, engagement of volunteers and lay workers in counselling, testing and patients tracking has contributed to improved HCT uptake and adherence to HIV treatment in South Africa to address the HRH shortage.

Medicines and technologies

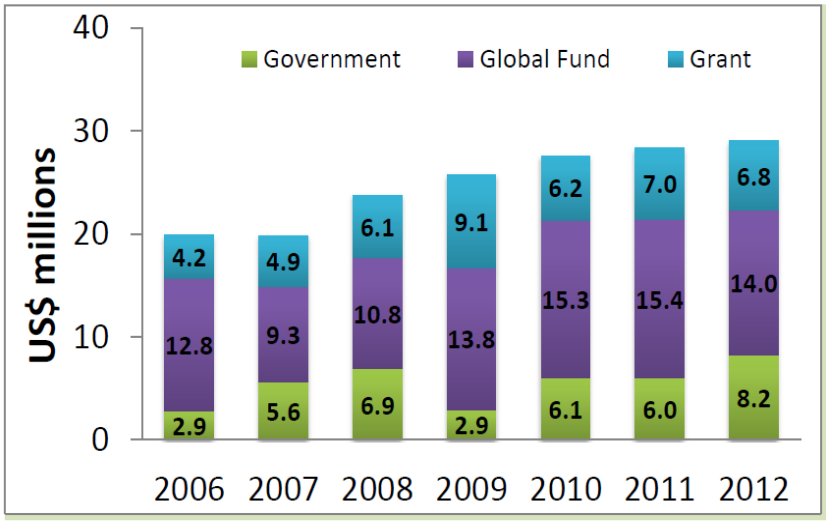
Nigeria is one of the countries being supported by the Global drug facility (GDF) in collaboration with WHO and the Stop TB partnership (NTBLCP 2014b). Anti-TB drugs and laboratory consumables are supplied to the NTBLCP through the GDF, therefore making the drugs and laboratory diagnosis for TB to be free (GDF 2013; NTBLCP 2014a). Similarly, anti-retroviral drugs and rapid HIV test kits are supplied to the state through the NACA which coordinates the AIDs control activities in Nigeria and these services are provided free of charge (NACA 2009). However, local storage and logistics management of TB and HIV medicines and laboratory consumables are the responsibility of the state and the LGA. The Human capacity for the logistics management are weak at state, LGA and facility levels (NACA 2014; NTBLCP 2014b). The WHO and GDF annual assessment of the Nigerian Tuberculosis control programme logistic management in 2013 identified weakness at the federal, state, LGA and Facility levels in logistic management (NTBLCP 2015). And Government commitments to supports the logistics management at the state and LGA levels have been

poor (NTBLCP 2015; TBLCP 2014). The effects of logistic management challenges on TB/HIV treatment outcome in Taraba State has not been studied, however, high mortality rate has been reported among HIV positive TB patients due to frequent stock out of ART drugs in Nigeria (Odume & Njepuome 2009).

Financing of TB/HIV services

Despite Abuja declaration for African States commitment to tackle TB, HIV and malaria burdens, government funding for TB control activities have been low in Nigeria and Taraba State (NTBLCP 2015). As presented below in figure 10 below, the programme is donor dependent which is not sustainable (NTBLCP, 2015). Similarly, in Taraba State, TBLCP programes activities are donor dependent and the supervision by programme managers is inadequate for lack of government support (TTBLCP 2014).

Figure 10: Funding of NTBLCP 2006-2012



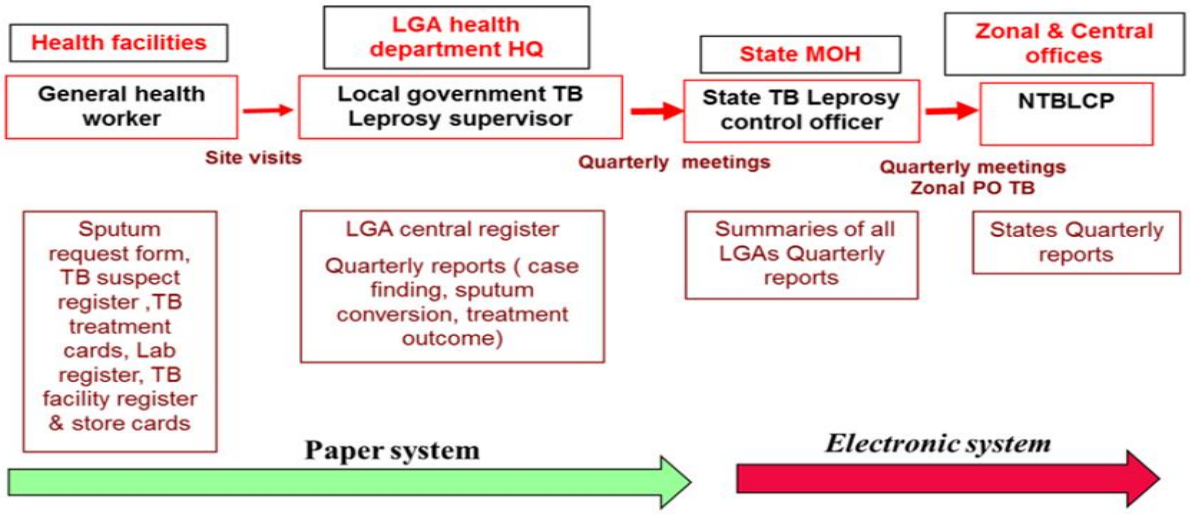
Source; NTBLCP 2015

Health management Information system

In Nigeria, the National Health Management Information system (NHMIS) was launched in 2006 and was equiped to improve on health data

capturing, storage, analysis and report generation (NSHDP 2009). Also existing is the National Bureau of Statistics which is backed by law and responsible for collecting as well as collating socioeconomic indicators to inform policy making in Nigeria (NSHDP 2009). However, these structures are weak at the state, LGA, and facility levels where the data are being generated. And TB data are still generated vertically to the NTBLCP as presented in figure 11 below without being integrated into the NHMIS (NTBLCP 2014a & 2015).

Figure 11: Data flowchart of Nigerian NTBLCP



From NTBLCP 2015:

The HWs have to do a lot of paper work at the facility level by filling several forms per patient and this may influence the quality of time the HW will have to talk with patients about their illness (NTBLCP 2014a & 2015). The LGTBLS summarizes the data and submits to the state quarterly for onward submission to the NTBLCP. And lack of electronic based data reporting can affect tracking of patients on treatment and affect decision making by major stakeholders in TB/HIV control activities (NTBLCP 2015 & WHO 2014a).

Leadership and Governance

TB/HIV activities in Nigeria are supported by various international and local partners through the NTBLCP (NTBLCP 2014a). Joint TB/HIV planning and implementation is being advocated at all levels.

Corruption, lack of accountability, and transparency characterize the poor leadership in the Nigerian health system. There is weak community engagement and participation in health policy. Intergovernmental and multisectoral collaboration and coordination is weak at all levels of governance (NSHDP 2009). For example, there is week collaboration between NTBLCP and other government agencies such as national primary health care development agency (NPHCDA), malaria control, immunization programmes, nutrition and school education programmes in community mobilizations about correct information on TB/HIV which is opportunity to pass correct information about TB/HIV to the public thereby improve demand for TB/HIV services (NTBLCP 2015). Government commitment in terms of funds allocation and release to TB control programmes is also weak at all levels (NTBLCP 2014b & 2015). Furthermore, collaboration between the state and LGAs in utilizing the vast PHC facilities and resources in implementing TB/HIV activities is weak (NTBLCP 2015; TTBLCP 2014).

3.4 TB treatment outcomes

The possible outcomes of TB/HIV patients on first line TB treatment for 6 months according WHO are cured, completed treatment, died, failed, lost to follow up also called defaulter, and these are defined in the list of glossary (WHO 2014a; NTBLCP 2014a). Cured and completed treatment are also classified as favourable outcomes while died, failed and lost to follow up are unfavorable outcomes (WHO 2014a).

Chapter 4: FINDINGS FROM OTHER COUNTRIES AND STANDARD PRACTICES

This chapter describes findings from other high burden TB/HIV countries and some international best practices in TB/HIV interventions.

4.1 Structural and policy factors

Poverty

Poor living and working environments have been reported as drivers for TB epidemic in Africa (Lönnroth et al. 2009). Poverty, unemployment and low educational levels have been reported to associated with high prevalence of TB in South Africa and is worsen in the presence of HIV infection (Harling et al. 2008). The poor usually stay in rural and slums that are far from health facility and being not able to afford transport cost to health facilities in time of need (Finnie et al. 2011: Ukwaja et al. 2013). Similarly, lower socioeconomic class are also being associated with higher incidence of TB especially in the presence of HIV and are also have poor access to TB/HIV care in poor countries (WHO 2010).

Kenya in addressing her high poverty and TB/HIV mortality has integrated TB/HIV activities into existing poverty alleviation programme (WHO 2014a).

4.2 Individual related factors

Age

According to the 2014 WHO global TB report, 7% of deaths among HIV negative TB patients worldwide were in children. However, there is no data for estimated deaths among HIV positive TB children in 2013. In Tanzania and Ethiopia, a similar high TB/HIV burden countries as Nigeria, studies have been reported that older age groups to be associated with higher

mortality rates among TB/HIV patients (Mugusi et al. 2009; Belayneh et al. 2015).

Sex

Globally TB deaths among HIV positive patients is similar among men and women and in the African region, more deaths occurred among women than men (WHO 2014a). A study conducted in South Africa reported higher mortality among female than in male HIV positive TB patients (Zwang et al. 2007).

Knowledge, attitude and practice about TB/HIV diseases

The low knowledge about TB/HIV reported in Nigeria (NTBLCP, 2012 & 2015) and Tanzania (Haasnoot et al. 2010) are similar to other findings of low knowledge and inappropriate attitudes in Ethiopia especially among residents that are far from health facility (Seyoum & Legesse 2013; Esmael et al. 2013) and Zambia where 39.8% of TB patients failed to comply with TB treatment when they started feeling better in a separate study due to lack of knowledge of the benefit of completing the course of TB treatment (Kaona et al. 2004). In Uganda, high defaulters were reported among TB/HIV co-infected patients due to patients not aware of duration of treatment (Elbireer et al. 2011).

In a systematic review study, patients' education, TB knowledge and consulting traditional healers contribute to patients delay for TB diagnosis and treatment in the sub-Saharan region that is worst affected by TB/HIV dual epidemic (Finnie et al. 2011).

Ethiopia with similar high DR among TB/HIV co-infected with low knowledge have used non-governmental organization (NGO) to deliver TB/HIV services including awareness creation (WHO 2014a).

Economic constraints

Though no adequate study from Nigeria and Taraba that give the influence of economic constraints on TB treatment outcome, several studies from Sub Saharan African and LMIC reported economic constraints as barriers to favourable TB treatment outcome among HIV patients. Loss of livelihood, assets, and income by patients as a results of seeking diagnosis and treatment for TB and HIV has been reported as main barriers to adherence in Zambia (Chileshe & Bond 2010). In the same study, lack of money to buy food needed during the period of treatment is a big problem and cost of transportation to the ART clinic was also reported as barrier to accessing ART by HIV positive TB patients. This is also due to loss of livelihood as a result of being sick. 45% of TB patients in Lusaka university teaching hospital could not comply with TB treatment as a result of lack of money for transportation to the hospital. This is related to place of residence of the patients which is usually rural or slums of the cities (Kaona et al. 2004).This could be worst for TB/HIV co-infected patients who will have to visit the hospital more frequent. Distance from facility have also contributed to high defaulters among HIV positive TB patients in Uganda because patients cannot afford transport cost to the facilities (Elbireer et al 2011). Several studies also reported barriers to TB treatment that affect HIV positive more than HIV negative patients such as low educational background and low socioeconomic status (Mugusi et al. 2009; Rodrigues et al. 2010; Voss De Lima et al. 2013).

Treatment and biomedical related factors

Late presentation and ART initiation

Though no enough data from Taraba State and the NTBLCP to ascertain the stage of TB/HIV patients on presentation, many studies have been done and reported late presentation to have contributed to high mortality

among TB/HIV co-infected patients in sub Saharan Africa (Agbor et al. 2010; Worodria et al. 2011; Belayneh et al. 2015). This late presentation could be related to many factors such as the knowledge and perception of patients about the diseases, accessibility to care and the quality of health service delivery (Seyoum & Legesee 2013; Esmael et al. 2013). All these factors may be related to the socioeconomic status of the patients and their place of residence (Rodrigues et al. 2010; WHO 2010). Similar study in Ethiopia has also reported a DR of 25.7% among TB/HIV patients due to non-initiation or delay initiation of ART (Belayneh et al. 2015). Increased mortality was reported in a study carried out in Uganda among TB/HIV co-infected patients due to late presentation with advance HIV disease and not starting ART (Worodria et al. 2011). In the same study, other causes of deaths reported were immune reconstitution inflammatory syndrome (IRIS) and Cryptococci infection (Worodria et al. 2011).

Adherence to treatment

The DOTs strategy has been proven to improve the cure rate and decrease mortality due to TB because the patients are observed either by a HW or a treatment supporter throughout the course of treatment (WHO 2014a). Poor adherence to treatment has been associated with high mortality and breeding of multi-drug resistant TB which is more difficult and expensive to treat than the first line drug susceptible TB, especially among HIV positive TB patients (WHO 2014a).

Patients beliefs in severity of TB in the presence of HIV infection, family and health professional supports have been reported to positively influenced adherence to TB treatment, while pills burdens, drug side effects, economic constraints, stigma and lack of adequate communication with health workers were barriers to adherence by HIV positive TB patients in Ethiopia (Gebremariam et al. 2010).

High rate of defaulters among HIV positive TB patients in Uganda were reported to be due to; distance from health facility, long waiting time, poor staff attitude and patients not aware of duration of treatment (Elbireer et al. 2011). In South Africa; a high TB/HIV burden country with weak health resources, study conducted the country has reported that spending quality time with patients on discussing the treatment of their illness have significantly improved adherence to treatment and ultimate favourable treatment outcomes (Goudge et al. 2009).

Adverse drug reaction

Adverse drug effects and pills burden has been reported to affect patients' treatments especially among HIV positive TB patients (Gebremariam et al. 2010; Rodrigues et al. 2010). The rate of severe adverse drug reaction has been reported to be higher among HIV positive TB patients than HIV negative but the rate of discontinuation of TB treatment was the same in both groups (Breen et al. 2006). The data of adverse drug reactions among HIV positive TB patients is poor in Nigeria (Nwokike 2008; NTBLCP 2014b; TTBLCP 2013). However, reporting of adverse drug reaction in countries with high TB/HIV burdens within the region could be reasons for surveillance and operational research gap needs in Nigeria and Taraba State.

Biomedical related factors

Comorbidity and diseases severity

There have been reported high prevalence of depressive disorders among TB/HIV co-infected patients in Ethiopia; TB/HIV co-infected patients were 1.7 times more likely to have common mental disorder (CMD) than non-co-infected HIV patients especially among the jobless and day labourers (Deribew et al. 2010). The rate of post-traumatic stress disorders (PTSD)

has been reported among TB patients and even higher among TB/HIV co-infected patients in South Africa with high burden of TB/HIV as Nigeria (Peltzer et al. 2012). Depression has been reported to be strongly associated with the quality of life of TB/HIV patients in Ethiopia (Deribew et al. 2009). Substance abuse has been reported to contribute to HIV-positive TB patients abandoning TB treatment in Brazil (Rodrigues et al. 2010).
Deterioration in HIV positive patients receiving anti TB treatment was attributed to other concurrent infections in Rwanda (Lorent et al. 2011). The presence of other AIDS-related opportunistic infections and other non-AIDS related conditions, low body weight and low CD4 cell count were associated with high mortality rate of 29.4% reported among TB/HIV patients in a tertiary hospital in Cameroun (Agbor et al. 2014). A study in Ethiopia reported a DR of 25.7% among TB/HIV patients due to low baseline body weight, older age, and WHO stage IV AIDs disease (Belayneh et al. 2015). Furthermore, the high mortality rate among HIV positive TB patients after TB treatment reported in a study carried out in Tanzania suggested causes of death other than TB were among these co-infected patients (Mugusi et al. 2009). Another study reported that IRIS is common among HIV positive TB patients on both DOTs and ART, and the risk is higher with short interval between DOTs and ART initiation (Burman et al. 2007). Uganda with high TB/HIV mortality has reported diabetes mellitus prevalence rate of 8.5% among TB patients in a facility study (Kibirige et al. 2013). However, no study was found of the prevalence (of diabetes) among TB/HIV co-infected patients.

Pregnancy

No much is known about effect of pregnancy on TB/HIV outcome in Taraba. However, TB and HIV have been reported to be major non-obstetric causes of maternal mortality in sub-Saharan Africa (Grange et al. 2010). High

maternal mortality has been reported among TB/HIV co-infected pregnant women in South Africa (Khan et al. 2001).

Nutritional Status

No literature is found on the effect of nutrition on TB/HIV treatment outcome in Taraba state and Nigeria. However, moderate to severe malnutrition have been reported to increase mortality among TB/HIV co-infected patients in Tanzania (Jeremiah et al. 2014) and Malawi (Zachariah et al. 2014). Other studies have reported effects of nutrition by measuring BMI and serum albumin to be significantly associated with high mortality among HIV positive TB patients (Fordham Von Reyn 2011; Tabarsi & Chitsaz 2012). Zechariah et al. (2014), has also reported decrease mortality rate and improved treatment outcome among HIV positive patients that were given nutritional supplementation.

4.3 Sociocultural factors

Stigma and discrimination

Although, there is no research that have been done on the influence of stigma on TB treatment outcome among HIV positive patients in Taraba State, some studies in other sub-Saharan African countries have reported influence of stigma on TB/HIV treatment outcome. A qualitative study conducted in South Africa explored how dual infection (TB/HIV) is associated with a unique form of social stigmatization that affects the ways in which patients experience and their quality of life (Daftary 2012). In another study in Zambia, TB/HIV co-infections were reported with deepening stigma by Chileshe and Bond (2010). Central to these patients was rejection, isolation, gossip and name-calling. Marriage dissolution was reported. However, PLHIV support group helped patients to initiate ART. Gebremariam et al. (2010) reported stigma and lack of disclosure of

diseases as barriers to TB treatment adherence in Ethiopia. Illiterates, females, and low socioeconomic individuals were more likely to have high perceived stigma (Deribew et al. 2010).

Ethiopia and Kenya integrating TB/HIV services into existing health and non-health related programme which has reduced stigma and improved access to quality TB/HIV care (WHO 2014a).

Misconceptions

There were reported misconceptions about TB/HIV in many countries such as in Ethiopia; that TB was caused by exposure to cold, excessive sunlight, mud, smoking, alcohol, and inadequate food intake. Some also believe that TB could transform itself to HIV (Gebremariam et al. 2011). Another study in Zambia reported that the bio-medical relation between TB and HIV has heightened TB stigma as TB becomes a marker for HIV due to the following misconceptions/behavior: that all people with TB have HIV and that TB is not curable among PLHIV (Campbell 2008). This could lead to seeking for cure outside the health facility and only to be presented late when other helps might have failed. A qualitative study in Ethiopia reported that patients' beliefs in curability of TB, and beliefs in the severity of TB in the presence of HIV promote adherence to TB treatment (Gebremariam et al. 2010).

Social support

Lack of family supports have been reported as barrier to HIV positive TB patients adhering to treatment in Zambia (Kaona et al. 2004) and Ethiopia (Gebremariam et al. 2010). Family supports have been reported to be strongly associated with quality of life of TB/HIV infected patients in Ethiopia (Deribew et al. 2009).

Gender inequality

In Zambia according to Chileshe & Bond (2010), gender relations undermined both men's and women's access to ART in Zambia. For example, no longer able to provide when very ill, men lost self-esteem. Women's access was also undermined due to lack of decision making power. Though no findings from Taraba State and Nigeria on the effects of gender inequality on TB/HIV treatment, these findings in Zambia could be reflective of many sub Saharan settings.

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4.4 Health system related factors

Service delivery

TB/HIV collaborative activities

Though, Taraba ART/CPT coverage is below the international standards, the benefits of ART and CPT have been reported to improve TB mortality among HIV positive TB patients in high burden countries like in Cameroun (Agbor et al. 2014), Malawi (Zachariah et al. 2003) and South Africa (Grimwade et al. 2005). Other countries that have reported reduced mortality due to ART initiation are Brazil (Schmaltz et al. 2012), Thailand (Manosuthi et al. 2006) and in cross national systematic report (Au-Yeung et al. 2011).

Integration of services and task shifting

In Rwanda a poor country with high TB/HIV burden like Nigeria has reported improved ART coverage among HIV positive patients through delivery of comprehensive HIV/AIDs services and TB care at the TB clinic for the period of TB treatment and referring patients to HIV programmes after completion of TB treatment improves ART coverage and decrease mortality among HIV positive TB patients (Howard & El-Sadr 2010). In the

same study, nutrition integration into TB and HIV care improved treatment outcome among TB/HIV patients through improved adherence among patients given supplementary food in Kenya and Zambia with similar burden of TB/HIV as Nigeria (Howard & El-Sadr 2010). In the same study, in Rwanda, shifting of tasks from physicians to nurses trained on HIIV management showed good results in terms of coverage and improved adherence. The physicians are to provide guide and supervision and concentrate on more skilled tasks. Similar task shifting from physicians to lower cadre of professionals like clinical officers have been reported to have improved some health indicators including TB/HIV treatment outcomes in Malawi and Mozambique (Bangdiwala et al. 2010).

Barriers to effective TB/HIV integration in LMIC have been reported to be due to inadequate facilities for service delivery, lack of human resources (both quantity and quality in terms of skills) and interrupted supplies of medicines and laboratory test kits and reagents (Legido-Quigley et al. 2013).

Community involvement

In a systematic review, involvement of community health workers (CHWs) and support groups in ART delivery yielded good results in Uganda and South Africa as evidenced by improved CD4 cell counts and decreases in viral loads (Bangdiwala et al. 2010). The same study also reported that engagement of CHWs in home-based service delivery is more cost effective than facility-based service delivery. And this did not only improve the TB treatment success rate but also contributed to improved immunization coverage, reduced maternal and under five mortality (Bangdiwala et al. 2010).

Quality of care

Several studies have reported quality of care to affect TB/HIV care in Ethiopia (Gebremariam et al, 2010), Uganda (Elbireer et al. 2011), South Africa (Goudge et al. 2009; Barnett et al. 2013) and sub-Saharan Africa (Finnie et al. 2011). The quality of care might be further compounded by over load of ill equipped health system by increasing burdens of TB/HIV in sub Sahara African region.

Good provider patient communication

Lack of adequate communication between the patients and health professionals was reported in Ethiopia as a barrier to TB/HIV patients adhering to TB treatment (Gebremariam et al. 2010). Productive interaction between health care providers and patients can lead to patients understanding their illness, treatment, and better action plan. And it can also lead to positive community and financial support to the patients especially the poorest in the community as reported by a study conducted in South Africa (Goudge et al 2009).

Skills of staff

Misdiagnosis at the facility level either because the health worker was not skillful enough to diagnose TB or did not suspect TB in the patients was reported by a systematic review study to contribute to system delay in diagnosing and treating TB patients in sub-Saharan African (Finnie et al. 2011).

Staff attitude

Though, no study have been done in Taraba State on the quality of TB/HIV care (TTBLCP. 2014), study conducted in South Africa reported, poor staff attitudes and missing medical records as barriers to patients and family

adherence to ART (Barnett et al. 2013). As reported earlier, quality of care can greatly affect patients adherence to treatment.

Poor structure and organization

Poor linkage between TB and HIV programmes and poorly organized health system have been reported to affect enrollment of HIV positive TB patients on ART in Zambia (Miyano et al. 2013). Lack of physical facilities to provide adequate privacy to patients and poor working environment were reported in Brazil to affect TB/HIV patients adherence to TB treatment (Rodrigues et al. 2010). Long waiting time, poor staff attitude and stock out of medicines have been reported to contribute to high defaulter among HIV positive patients in Uganda (Elbireer et al. 2011).

Human Resources for Health

There is strong positive correlation between health workforce density, service coverage and health outcome (WHO, 2007).

Malawi and South Africa with high TB/HIV burden and HRH challenges as Nigeria which is affecting the quality of care for TB/HIV patients (Harries et al. 2005). Furthermore, these countries engaged volunteers and lay workers in counselling, testing and patients tracking which have been reported to contributed to improved HCT uptake and adherence to HIV treatment in South Africa (Harries et al, 2005).

Health management Information system

Use of electronic data capturing tools of HIV clients on ART in South Africa has been reported to be vital in monitoring of patients treatment and switch of regimens (Karim et al. 2009). Electronic capturing tool for TB patients recommended by WHO could go along way to improve monitoring of TB/HIV patients on treatment (WHO 2014a).

Financing of TB/HIV services

In a cross national systematic study, a high proportion of out of pocket payment by patients increased the mortality rate among TB/HIV co-infected patients due to late presentation at the health facilities as a result of seeking self-medication at the onset of illness (Au-Yeung et al. 2011). In the same study, improved government per capita expenses on health reduced the mortality rate among TB/HIV patients in those countries.

Leadership and Governance

Weak political will have been reported to delay HIV interventions and public views in South Africa (Karim et al. 2009).

Coordinated integration of TB and HIV care services has been reported to improve TB treatment outcomes among HIV positive TB patients in Ghana a LMIC like Nigeria (Ansa et al 2012). In Ethiopia, an NGO called **Save the Children** has integrated community TB and TB/HIV services into an existing community Maternal newborn and Child Health (MNCH) programme in the Somalia region and it is yielding positive results (WHO 2014a). Similarly, in Kenya, a grass roots poverty alleviation programme working with a fishing community has also integrated community TB activities into its programme (WHO 2014a).

4.5 Other TB/HIV interventions (Best practices)

The Practical Approach to Lung health (PAL) which is an integrated strategy recommended by WHO to manage respiratory diseases in PHC settings with priority focused on improving TB CDR and quality of care in LMIC with high burden of TB and HIV is not being practiced in Nigeria in general and Taraba State in particular (WHO 2005; NTBLCP 2015).

South Africa, in order to address the dual epidemics of TB and HIV adopted in her weak health system a four priority interventions for TB and HIV interventions as summarize in table 5 below (Karim et al. 2009).

Table 5: South African priority to tackle TB/HIV dual epidemics

Priority for TB control interventions	**Priority for HIV control intervention**
1. Improve TB cure rate 2. Improve TB case detection 3. Integration of TB/HIV services 4. Identification and treatment of drug resistant TB	Priority for HIV prevention 1. Know your epidemics 2. Scale up behavioral change, PMTCT &HCT 3. Legislation on sex work, gender violence and migrant labour 4. Safe male Circumcision
	Priority for HIV treatment 1. Scale up provided initiated HCT 2. Early ART initiation 3. Maintain viral supression

Source: Karim et al, 2009

Chapter 5: DISCUSSION

Chapter 5 describes the analysis of the TB/HIV cohort data and the findings of factors influencing treatment outcomes of TB among the TB-HIV co-infected patients using the conceptual framework.

5.1 TB data analysis

The high TB/HIV co-infection rate observed in this study, is not surprising based on the deleterious effects of HIV on immune system causing susceptibility to opportunistic infections like TB. The increasing DR observed among HIV positive TB patients is not acceptable despite the ongoing TB/HIV collaboration. The reasons for high DR among HIV positive TB patients could be due to low ART and CPT coverage, which is far from the STOP TB target of 100% (WHO, 2014a). And the higher DR observed among TB/HIV co-infected patients placed on treatment (ART and CPT) compared with those not on treatment, though is statistically not significant (p=0.97), could be due to factors such as late presentation of PLHIV (usually presenting for care as very ill patients or at an advanced stage of disease) or IRIS. The increasing trend of DR need to be reversed by possibly adopting the Rwanda model of integrating ART services into TB clinic so as to improve the ART coverage among TB/HIV co-infection in Taraba State that might contribute to reducing the DR. Furthermore, highest DR among the reproductive age group could be as a results of highest incidence of TB/HIV in the group or the biomedical relationship between TB/HIV since this is the sexually active age group (commonest route of HIV transmission in Nigeria is through heterosexual intercourse). Future research may have to address this.

Despite availability of TB/HIV collaborative activities in all the LGAs, 239/3025 (8%) of TB patients were not tested for HIV in the state in 2013.

This could be due to: (1) unwillingness of TB patients to consent for HIV testing because of stigma, (2) poor or weak data capturing of patients on treatment, (3) logistic problems within the respective HFs, (4) quality of counselling being offered. However, future study of the quality of care to TB/HIV patients in the state may find some answers to this question.

5.2 Structural and policy factors

Poverty is a strong factor contributing to high mortality because of its cross cutting effect as relates to TB/HIV mortality. Poverty could keep individuals at lower educational levels with lower economic power, poor knowledge of TB/HIV diseases, financial barriers to accessing diagnosis and even continued treatment if confirmed to have the diseases.

Furthermore, out-of-pocket payments in combination with loss of employment due to morbidity will further push the patients deeper into poverty. Those who cannot afford out of pocket payments for other conditions may be denied those unpaid services. This will contribute to poor management of co-morbidity that is already associated with higher mortality risk among TB/HIV patients.

No government or partners programme is targeting poverty which is the main root causes of high mortality among TB/HIV in Nigeria (NTBLCP, 2015).

5.3 Individual factors

Significant findings from the review of literature on individual factors influencing TB treatment outcomes among HIV positive patients are: sex, knowledge, attitude and practice (KAP) of individuals and financial constraints. Correct KAP about TB/HIV diseases could influence treatment outcome positively and incorrect KAP could influence the treatment outcome negatively. Economic constraints could also negatively influence the treatment outcomes through interaction with other factors like nutrition

and indirect cost of accessing TB/HIV care. And extending transport allowance being currently given to MDR-TB patients on treatment to TB/HIV co-infected patients could help to cope the economic constraints faced by them during treatment.

Biomedical and treatment related factors

Biomedical and treatment related factors that can influence TB treatment outcomes negatively includes; poor adherence, comorbidity, malnutrition, adverse drug reaction, disease type and severity and IRIS. Improving adherence by improving quality of TB/HIV care may reduce the high DR among Tb/HIV patients. Furthermore, improving nutrition status and early detection of adverse drug reaction and proper management could influence TB treatment outcome positively among PLHIV.

Therefore nutritional assessment of all TB/HIV patients before and during treatment may be considered by the NTBLCP and Taraba State TBLCP may consider piloting this in 2-3 LGAS. Lack of comorbidity data in Nigeria and Taraba State and reporting of high comorbidity prevalence rate (of mental health and diabetes) in high TB/HIV burden countries and its contribution to high mortality calls for improvement in comorbidity surveillance more contextual research.

5.4 Sociocultural factors

Sociocultural factors that can negatively influence TB treatment outcome among PLHIV are: high stigma and discrimination (double stigma) and misconception about the causes and treatment of TB/HIV diseases while social supports and gender equality could positively influence the treatment outcome. Double stigma in against TB/HIV patients in Taraba State and Nigeria could constitute barrier to quality care. Using Ethiopia model of

integrating TB/HIV services into other programmes like immunization might improve access to quality care thereby improving treatment outcome among TB/HIV patients in Taraba State. Further

5.5 Health system related factors

The following health system-related factors were identified to negatively affect TB treatment outcomes: inadequate TB/HIV collaborative service, poor TB/HIV integration, inadequate and disparity in HRH distribution/mal-distribution of HRH, poor quality of care, poor data capturing and storage, stock out of medicines, high out of pocket expenditure for health care service and weak collaboration between TB/HIV programmes and other health programmes like nutrition. Quantitative and qualitative research to assess the quality of care for TB/HIV co-infected patients and also to include community perception about TB/HIV disease in the context of Taraba State could help to guide the direction of intervention. Furtermore, to reduce the DR among the HIV positive patients in weak health system and high number CHWs in Taraba State, PAL strategy could be introduce in phases and strengthening supervision by the SMOH could improve quality of care at the PHC that are closer to the poor who are mostly affected by TB/HIV.

Community involvement as in South Africa and Malawi model of engaging community volunteers and lay workers may help to improve access to quality TB/HIV care in Taraba State and also reduce costs of hospital visits by the patients. This will be feasible because of relatively higher number of community health workers compared to other health professional.

5.6 Interaction of factors influencing treatment outcomes

Findings from the literature review indicate an interaction of within and across the factors influencing treatment outcomes. Like within individual factors, the knowledge and attitude of individual may depend on his age or sex. And within the health system, lack of adequate HRH may lead to over load of available staff which could affect the quality of service being provided. Interaction across factors like poverty in a structural factors may affect the individual access to care and level of education which will affect his KAP. The location of health facilities due to lack of transportation or high out of pocket payment for services could constitute barrier to early health seeking behavior. Furthermore, high level of stigma (sociocultural) could affect access to quality TB/HIV care (health system).

5.7 Limitation of the Study

The current TB treatment register do not capture the CD4 cells count and viral load of HIV positive TB patients that could give in depth analysis of stage of presentation of these patients and progress in the course of treatment. Timing of ART initiation could not be extracted from the current TB register. Socioeconomic class of patients are not also captured in the register. TB data analyzed are facility data from NTBLCP programme, outcomes of patients treated outside the NTBLCP could not be ascertained. Also, some errors of the Health workers and LGTBLS in classifying and entry of patients' data into the TB register cannot be detected and/or corrected. The literature review is based on the data from published and unpublished journal articles and reports and any error that might have occurred in the primary data collection, collation, analysis and interpretation cannot be corrected and might have affected the reliability and validity of my work.

The literature review was done in English language only.

Chapter 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

This study analyzed the treatment outcomes in a cohort of TB patients registered in Taraba State in 2013. In addition, factors influencing treatment outcomes among HIV positive TB patients and level and gaps in the implementation of TB/HIV collaborative activities in Taraba State were identified and analyzed.

DR and CR were statistically significant in HIV positive TB patients compared to HIV negative patients. In addition, despite TB/HIV collaborative efforts, the CDR and ART and CPT coverage rates are still below national and international (WHO) targets.

Gaps in data analysis include; lack of CD4 counts and viral loads, no socioeconomic status of TB patients being captured in the TB treatment register. Also TB/HIV patients managed outside the NTBLCP network were not analysed. Research related gaps identified are; no research done in the country and Taraba State to ascertain the quality of care to TB/HIV patients and also the prevalence of comorbidity (such as mental disorder and diabetes). In addition, malnutrition prevalence rate among TB/HIV patients need to be researched for appropriate intervention.

Several factors were observed to influence TB treatment outcome. Prevalent among the factors are; poverty, high level of stigma which is rooted in misconception and low knowledge about TB/HIV diseases. Others include; weak TB/HIV integration into PHC, weak community engagement, weak collaboration with other programme and Community based organization in TB/HIV intervention.

6.2 Recommendations

In order to address the increasing DR among TB/HIV patients, the following recommendations are made to the NTBLCP, Taraba State Government and Partners in TB/HIV control in Nigeria.

6.2.1. Recommendations to NTBLCP

1. To update the current TB treatment register to capture CD4 cells count, viral load and socioeconomic status of patients.
2. Strengthen collaboration between health programmes like NPHCDA, nutrition, immunization and malaria control programmes for integrated implementation of TB/HIV services.
3. Engagement of NGOs and CBO for delivery of TB/HIV services. NGOs and CBOs can be empowered to be as in Kenya and Ethiopia models of integrating TB/HIV services into their primary intervention programme.
4. NTBLCP to consider implementation of PAL in Nigeria to strengthen the weak health system to improve CDR and quality of TB/HIV care using Taraba State as one of the piloting states.

6.2.2 Recommendations to Taraba State Ministry of Health

1. To strengthen TB/HIV collaboration to ensure that ART services are provided to HIV positive TB patients at the DOTs clinic throughout TB treatment and only refer to the ART clinic after completing TB treatment or there are indications (before completing TB treatment) in order to improve the ART/CPT coverage thereby contributing to decrease mortality. This can be piloted in 1-2 LGAS.
2. To launch qualitative and quantitative research to assess the quality of care in TB/HIV treatment programs in Taraba State including the community perception about TB/HIV so as to explore why ART and

CPT coverage among HIV positive TB patients is below the WHO targets.

3. To research the burden of comorbidity (diabetes and mental health) and malnutrition among TB/HIV co-infected patients in Taraba State.
4. To sustain the current treatment supporters for TB treatment and engage community volunteers and lay workers in delivery home based TB/HIV care using the South Africa and Malawi model

6.2.3 Recommendations to TB/HIV partners

1. In the short term, food supplements and transport allowances should be given to TB/HIV patients to help cope the costs of treatment.
2. For long term, to include poverty alleviation in TB/HIV intervention activities in Nigeria and Taraba State in particular such as vocational training and skills acquisition programmes.

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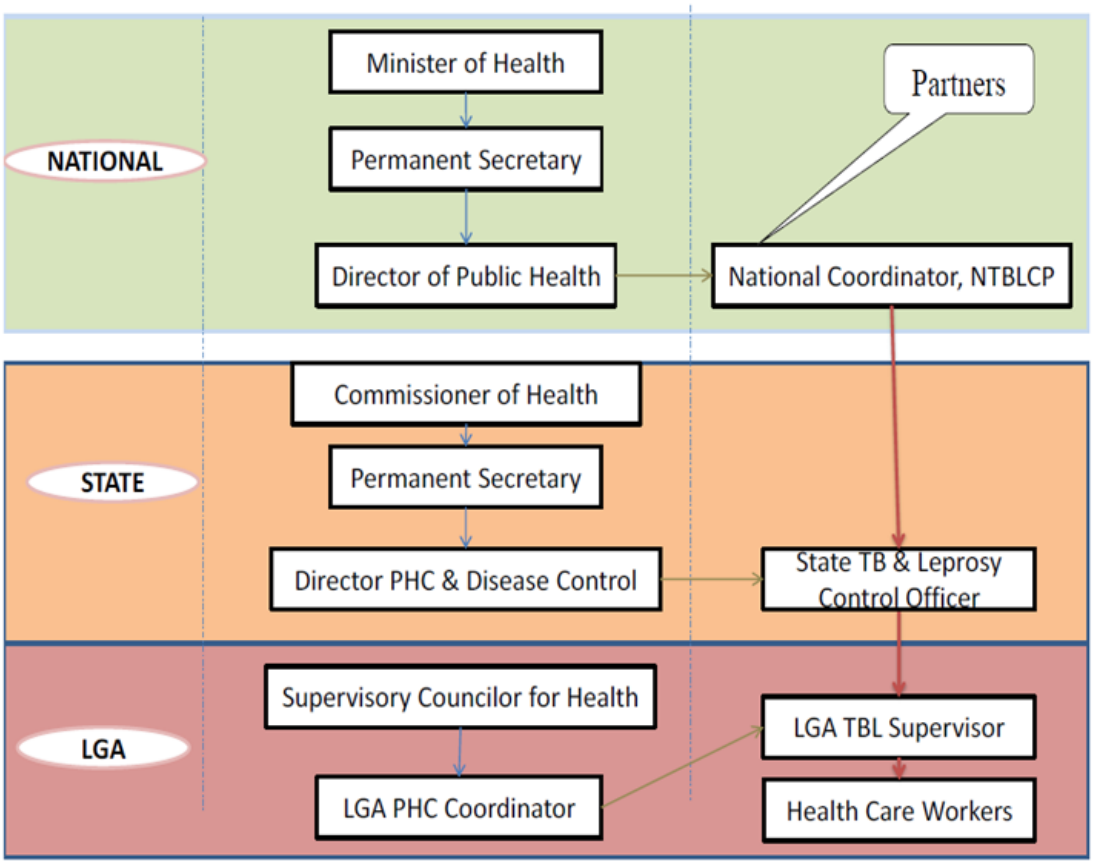
Annex 1: Some Nigerian Health Indicators (Relation to MDGs)

MDG-4: Reduce child mortality(by two thirds between 1990 &2015)							
	1990	**2013**	**MDG target 2015**				
Under-five mortality rate(deaths per 1,000 live births)	213	117	71				
Measles immunization coverage among 1 year old (%)	54	59	100				
MDG-5a: Improve maternal health(reduce deaths by three quarters between 1990 &2015)							
	1990	**2013**	**MDG target 2015**				
Maternal mortality ratio(per 100,000 live births)	1,200	560	300				
MDG-5b: Universal access to reproductive health							
	2006-2013		**MDG target 2015**				
Birth attended by skilled personnel(%)	38		100				
Antenatal care coverage at least one visit	61		100				
Unmet need for family planning	19		0				
MDG-6: Combat HIV/AIDs and other diseases							
	2001	**2005**	**2007**	**2009**	**2010**	**2012**	**2013**
Prevalence of HIV among adults (%)	3.6	3.8	-	3.6			3.2
Estimated malaria deaths					15,479	19,000	
Incidence of TB(per 100,000 population)			342	-	340	-	338
MDG-7: Ensure environmental sustainability							
	1990	**2012**	**MGD target 2015**				
Population using improved drinking water(%)	46	64	69				
Population using improved sanitation (%)	37	28	55				
MDG-1: Eradicate extreme poverty and hunger							
	1990-1995	**2006-2012**	**MGD target 2015**				
Children aged <5 years underweight (%)	35.1	24.4	12				
MDG-2: Achieve universal primary education							
	2007-2012	**MDG target 2015**					
Percentage net enrolment ratio in primary education	57.6	100					

From WHO data base 2014b

Annex 2: NTBLCP Organogram



Source: NTBLCP Strategic plan 2015-2020

Annex 3: Statistical tests table on TB/HIV treatment outcomes

1. Deaths in TB patients by HIV status

		Death of TB patients		
		yes death	No death	
HIV status	Positive	100	727	827
	Negative	122	1837	1959
		222	2564	2786

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in HIV positive	12.09%	10.04, 14.5	Taylor series
Risk in HIV negative	6.228%	5.237, 7.389	Taylor series
Overall Risk	7.968%	7.018, 9.034	Taylor series
Risk Ratio	1.942	1.51, 2.497[1]	Taylor series
Risk Difference	5.864%	3.398, 8.33°	Taylor series
Etiologic fraction in pop.(EFp)	21.85%	12.94, 30.76	
Etiologic fraction in exposed(EFe)	48.5%	33.77, 59.95	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	27.27	<0.0000001	0.000000177
Yates corrected chi square	26.48	0.000000134	0.000000267
Mantel-Haenszel chi square	27.26	<0.0000001	0.000000178
Fisher exact		0.000000317	0.000000634
Mid-P exact		0.000000233	0.000000466

2. Death among HIV positive TB patients by sex

	Death		
	Yes	No	
Femal	55	37	42

Sex	e		2	7
	Male	45	35 5	40 0
		100	72 7	82 7

Risk-Based* Estimates and 95% Confidence Intervals

	Point Estimates		Confidence Limits	
	Type	**Value**	**Lower, Upper**	**Type**
	Risk in Female	12.88 %	10.01, 16.41	Taylor series
	Risk in Male	11.25 %	8.493, 14.74	Taylor series
	Overall Risk	12.09 %	10.04, 14.5	Taylor series
	Risk Ratio	1.145	0.7912, 1.657[1]	Taylor series

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.5166	0.2362	0.4723
Yates corrected chi square	0.3746	0.2703	0.5405
Mantel-Haenszel chi square	0.516	0.2363	0.4726
Fisher exact		0.2705	0.5411
Mid-P exact		0.2376	0.4752

3. Death among HIV positive TB patients by ART coverage

		Death		
		Yes	No	
	Yes	45	298	343
ART	NO	55	429	484
		100	727	827

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in ART	13.12%	9.929, 17.13	Taylor series
Risk in not ART	11.36%	8.819, 14.52	Taylor series
Overall Risk	12.09%	10.04, 14.5	Taylor series
Risk Ratio	1.155	0.7984, 1.67[1]	Taylor series
Risk Difference	1.756%	-2.8, 6.312°	Taylor series
Etiologic fraction in pop.(EFp)	6.023%	-9.583, 21.63	
Etiologic fraction in exposed(EFe)	13.38%	-25.25, 40.1	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.5166	0.2362	0.4723
Yates corrected chi square	0.3746	0.2703	0.5405
Mantel-Haenszel chi square	0.516	0.2363	0.4726
Fisher exact		0.2705	0.5411
Mid-P exact		0.2376	0.4752

4. Death among HIV positive TB patients by CPT coverage

		Death		
		Yes	No	
CPT	Yes	76	525	601
	NO	24	202	226
		100	727	827

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in CPT	12.65%	10.21, 15.55	Taylor series
Risk in not on CPT	10.62%	7.188, 15.37	Taylor series
Overall Risk	12.09%	10.04, 14.5	Taylor series
Risk Ratio	1.191	0.7726, 1.835[1]	Taylor series
Risk Difference	2.026%	-2.79, 6.842°	Taylor series
Etiologic fraction in pop.(EFp)	12.18%	-16.7, 41.06	
Etiologic fraction in exposed(EFe)	16.02%	-29.44, 45.52	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.6343	0.2129	0.4258
Yates corrected chi square	0.458	0.2493	0.4986
Mantel-Haenszel chi square	0.6335	0.2130	0.4261
Fisher exact		0.2518	0.5035
Mid-P exact		0.2161	0.4322

5. Cured new smear positive(NSP) HIV positive TB patients by ART coverage

		Cured		
		Yes	No	
ART	Yes	96	44	140
	NO	121	55	176
		217	99	316

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in ART	68.57%	60.46, 75.69	Taylor series
Risk in not ART	68.75%	61.55, 75.15	Taylor series
Overall Risk	68.67%	63.35, 73.54	Taylor series
Risk Ratio	0.9974	0.8585, 1.159[1]	Taylor series
Risk Difference	-0.1786%	-10.47, 10.12°	Taylor series
Prevented fraction in pop.(pfp)	0.1151%	-6.983, 6.33	
Prevented fraction in exposed(pfe)	0.2597%	-15.88, 14.15	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.001156	0.4864	0.9729
Yates corrected chi square	0.007758	0.4649	0.9298
Mantel-Haenszel chi square	0.001152	0.4865	0.9729
Fisher exact		0.5344(P)	>0.9999999
Mid-P exact		0.4859(P)	0.9717

6. Cured NSP HIV positive TB patients by CPT coverage

		Cured		
		Yes	No	
CPT	Yes	144	65	209
	NO	73	34	107
		217	99	316

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in CPT group	68.9%	62.32, 74.8	Taylor series
Risk in not CPT	68.22%	58.88, 76.31	Taylor series
Overall Risk	68.67%	63.35, 73.54	Taylor series
Risk Ratio	1.01	0.8622, 1.183[1]	Taylor series
Risk Difference	0.6752%	-10.15, 11.5°	Taylor series
Etiologic fraction in	0.6503%	-9.777, 11.08	

pop.(EFp) Etiologic fraction in exposed(EFe)	0.98%	-15.99, 15.47

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	0.015	0.4513	0.9025
Yates corrected chi square	0.00003223	0.4977	0.9955
Mantel-Haenszel chi square	0.01495	0.4513	0.9027
Fisher exact		0.5002	>0.9999999
Mid-P exact		0.4497	0.8994

7. Cured among new SP TB by HIV status

		Cured		
		yes	No	
HIV	Positive	219	97	316
	Negative	932	201	1133
		1151	298	1449

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	25.39	0.000000235	0.000000469
Yates corrected chi square	24.6	0.000000353	0.000000705
Mantel-Haenszel chi square	25.37	0.000000237	0.000000473
Fisher exact		0.000000795(P)	0.000001590
Mid-P exact		0.000000585(P)	0.000001171

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Cure in HIV positive	69.3%	64.01, 74.14	Taylor series
Cure in HIV negative	82.26%	79.92, 84.38	Taylor series
Overall Risk	79.43%	77.28, 81.44	Taylor series
Risk Ratio	0.8425	0.7791, 0.911[1]	Taylor series
Risk Difference	-12.96%	-18.51, -7.405°	Taylor series

Annex 4: STOP TB Strategy components and Taraba State implementation

The *Stop TB Strategy* at a glance

VISION	A TB-free world
GOAL	To dramatically reduce the global burden of TB by 2015 in line with the Millennium Development Goals (MDGs) and the Stop TB Partnership targets
OBJECTIVES	■ Achieve universal access to high-quality care for all people with TB
	■ Reduce the human suffering and socioeconomic burden associated with TB
	■ Protect vulnerable populations from TB, TB/HIV and drug-resistant TB
	■ Support development of new tools and enable their timely and effective use
	■ Protect and promote human rights in TB prevention, care and control
TARGETS	■ MDG 6, Target 6.c: Halt and begin to reverse the incidence of TB by 2015
	■ Targets linked to the MDGs and endorsed by the Stop TB Partnership: — 2015: reduce prevalence of and deaths due to TB by 50% compared with a baseline of 1990 — 2050: eliminate TB as a public health problem (defined as <1 case per 1 million population per year)

COMPONENTS

1. **Pursue high-quality DOTS expansion and enhancement**
   a. Secure political commitment, with adequate and sustained financing
   b. Ensure early case detection, and diagnosis through quality-assured bacteriology
   c. Provide standardized treatment with supervision, and patient support
   d. Ensure effective drug supply and management
   e. Monitor and evaluate performance and impact
2. **Address TB/HIV, MDR-TB, and the needs of poor and vulnerable populations**
   a. Scale up collaborative TB/HIV activities
   b. Scale up prevention and management of MDR-TB
   c. Address the needs of TB contacts, and of poor and vulnerable populations
3. **Contribute to health system strengthening based on primary health care**
   a. Help improve health policies, human resource development, financing, supplies, service delivery and information
   b. Strengthen infection control in health services, other congregate settings and households
   c. Upgrade laboratory networks, and implement the Practical Approach to Lung Health
   d. Adapt successful approaches from other fields and sectors, and foster action on the social determinants of health
4. **Engage all care providers**
   a. Involve all public, voluntary, corporate and private providers through public–private mix approaches
   b. Promote use of the *International Standards for Tuberculosis Care*
5. **Empower people with TB, and communities through partnership**
   a. Pursue advocacy, communication and social mobilization
   b. Foster community participation in TB care, prevention and health promotion
   c. Promote use of the *Patients' Charter for Tuberculosis Care*
6. **Enable and promote research**
   a. Conduct programme-based operational research
   b. Advocate for and participate in research to develop new diagnostics, drugs and vaccines

Source: WHO Global TB Report, 2014

Taraba State "Stop TB strategy" implementation update, 2014

STOP TB STRATEGY COMPONENTS	LEVEL OF IMPLEMENTATION in Taraba	REMARKS
1. Pursue high quality DOTS expansion and enhancement	• 83 Health facilities providing DOTs services in the state • 45 HF providing laboratory services • Monthly and quarterly supervision by the LGTBLS/SS	Donor driven
2. Addressing TB/HIV and MDR-TB	• TB/HIV technical working group in the state • 23HF provide ART/DOTs • 57 HF provide HCT/DOTs • Two Genexpert Machines in the state • 20 bed capacity MDR-TB ward in SSH, Jalingo	
3. Contribute to health system based on primary health care	• Improved infection control in all secondary facilities. • >70% DOTs services in primary health care	Donor dependent
4. Engage all care providers	• 10 private HF and 2 FBO HF provide DOTs • Patents medicine vendors are engage in case detection	Minimal involvement of traditional healers
5. Empower people with TB and community through partnership	• Patients centred approach in DOTs • >80% of TB patients supervised treatment by TS	Minimal involvement of community, religious leaders and TB patients advocates
6. Enable and promote	Nil	No technical and financial support for operational research

From Taraba TBLCP update 2014

Taraba State TB/HIV collaborative activities update, 2014

TB/HIV Collaborative activities	Level of implementation in Taraba State	Remarks
Establishing and strengthening coordination mechanisms for delivering integrated TB and HIV services	State adopted the national policy on TB/HIV collaborative activities. state TB/HIV technical working group in place and meets quarterly	Meeting is GFATM supported
HIV testing for all patients with	92% TB patients tested for HIV in	

presumptive and diagnosed TB	2013.	
Provide ART and CPT to all HIV positive TB patients	41.5% ART coverage and 75% CPT overage	
Provide HIV prevention service to TB patients	92% tested for HIV	
Intensifying TB case finding among PLWHAs	No record	
Offering isoniazid preventive therapy to PLWHAs who do not have active TB	No record	
Preventing transmission of TB infection in health care and congregate setting	Both tertiary facilities and all 20 secondary facilities have infection control in place,	Implementation at PHC is weak

From WHO global TB report 2014 and Taraba update 2014