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## Health Education and Information: a Panacea to Tuberculosis Prevention and Eradication in Nigeria

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### ABSTRACT

Tuberculosis (TB) is an infectious disease caused by mycobacterium tuberculosis. Tuberculosis is a major public health problem in Nigeria, being one of the ten leading causes of hospital admissions and a leading cause of death in adults, especially among the economically productive age group. This paper critically examined the importance of health education towards the eradication and prevention of tuberculosis in Nigeria. It was reviewed and discussed under the following subheadings; Global burden of tuberculosis in Nigeria, concept, definition and etiology of tuberculosis Signs and symptoms of tuberculosis, diagnosis of tuberculosis, causative agent, modes of infection and incubation period, risk factors of pulmonary tuberculosis Dots and stop TB programmes in Nigeria Treatment and prevention of tuberculosis TB treatment strategies Dealing with treatment problems in Nigeria Stigmatization against Tuberculosis Patients Health education as a tool for achieving free tuberculosis country. Emphasis for Tb control has been placed on the development of improved vaccines, diagnostic and treatment courses but less on health education and awareness. Although the need for these tools is indisputable, the obstacle facing the spread of TB go beyond technological. The findings of this study may stimulate health system policy makers, Government and non- governmental organizations, donor agencies and other stakeholders in planning and designing health education intervention programmes on the control and eradication of tuberculosis. It therefore recommended that Government should implement health education as part of the DOTs, this will thus empower the tuberculosis patients on ways to live healthy, lifestyle, in doing this, they will recover fastly and prevent them from spreading the disease.

**Keywords:** Health Education; Tuberculosis; Eradication; Communicable Diseases; Nigeria

## **1. INTRODUCTION**

Culturally, the African nations were known to handle every calamity using traditional methods to solving such problems, while attributing the causes of such to some unforeseen spiritual forces. The treatment of such ailments may have resulted from lack of knowledge of scientific principles were handled using traditional methods. Some of these diseases which are either hereditary, or infectious in nature which include sickle cell diseases, small pox, leprosy and tuberculosis and lately, HIV/AIDS, Ebola Virus Diseases and the recent endemic disease which is yet to be diagnosed that occurred in Ilaje Local Government Area of Ondo State where over 18 casualties have been reported (Vanguard, 2015). Victims of such diseases were either abandoned in the bushes to die or hid in the compound of the relations to die for the sake of stigmatization that might come to the families of the victims.

The emergence and incidence of such diseases in human populations has increased during the last two decades despite the existence of cost effective intervention for their control. Infectious diseases continue to be a serious burden around the world, in developing and industrialized countries alike whether naturally occurring or intentionally inflicted. These lists include tuberculosis, malaria, dengue, and other insect borne disease. In the midst of poor economy, corruption and political instability, infectious diseases have become one of the greatest disease burdens in Africa (Erah & Ojieabu, 2009).

Tuberculosis (TB) is an infectious disease caused by mycobacterium tuberculosis. According to the World Health Organisation (WHO), there are an estimated 88 million new cases annually and further stated that tuberculosis emerged as the leading cause of death from any single infectious agent and has continued to be a major public health problem all over the world (WHO, 2014). The bacteria that causes TB (*M. Tuberculosis*, *M – bovis* and *M-africanum*) are responsible for lesions called tubercle in patients with TB hence the organisms are known as tubercle bacilli also known as acid- fast bacilli (AFB) (Harries & Maher, 2014). According to Crofton, Horne and Miler (2013), the signs and symptoms of pulmonary TB are as follows; limited to minor cough and mild fever, if apparent fatigue, unintentional weight loss, coughing up blood, fever and night sweats, phlegm-producing cough, wheezing, excessive sweating, chest pain, breathing difficulty

In its most usual form, TB commonly attacks the lungs, but can affect some other organs in the body. National Tuberculosis and Leprosy Control Programme (NTBLCP) worker's Manual (2010) established that tuberculosis affect any organ in the body. In 25 percent of the active cases, the infection moves from the lungs to cause other kind of tuberculosis collectively called Extra Pulmonary Tuberculosis (EPTB). Tuberculosis of the lung is regarded as Pulmonary Tuberculosis (PTB), while Extra Pulmonary Tuberculosis can affect vertebral spine, kidney and urinary tract, upper respiratory tract (larynx), meninges of the brain (meningitis), lymph node and skin. The causative organism is transmitted extensively by inhalation of infective droplets from patients with open pulmonary tuberculosis through coughing, sneezing, talking or spitting (Johnston & Wildrik, 2010). Gilbert (2009) further asserted that concentration of droplet nuclei in contaminated air, length of time a person breaths in air and level of communicability (susceptibility to infection) are some of the factors which determine an individual's risk of exposure.

Nigeria experienced upsurge of tuberculosis cases over the past decade. In 2009, WHO estimates that 460,000 new cases of all forms of TB occurred in the country. Tuberculosis is a big global problem such that the disease led to the development of Directly Observed

Treatment Short-Course (DOTS) by WHO in 1995, and more recently, the stop TB strategy in 2006. In Nigeria, the DOTS Programme has been implemented in all states and local government areas in the country and over 3,000 DOTS centers have been operating across the country (Iyiola, 2010).

However, in spite of all the DOTS centers, Nigeria for over 10 years has remained on the 4<sup>th</sup> position of countries with the highest burden of TB in the world. Health Education is defined as any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes (WHO, 2008; Johnson, 2010). The global targets and indicators for TB control have been developed within the framework of the Millennium Development Goals (MDGs), stop TB Partnership and WHO's initiative on tuberculosis. The goal can only be achieved through the inculcation and adequate health education and awareness among the populace (Johnson, 2010). Health Education helps to promote and create awareness on various illness and ways in which the general public can manage and control it. The Federal Government through the Federal Ministry of Health (FMOH) achieved a country free of Ebola Virus Diseases (EVD) through the use of health surveillance, adequate treatment and Health education (FMOH, 2014). The same can be adopted to eradicate TB but much coverage has not been given to TB.

### **Statement of the Problem**

Tuberculosis an old disease that poses new threat remains a public health issue in Nigeria, having been ranked as the second cause of death from single infectious disease after HIV/AIDS. The World Health Organization initiated the stop TB programmes and Directly Observed Treatment Short Course centers to eliminate tuberculosis and also to meet the Millennium Development Goals 2015 of combating HIV/AIDS, malaria and tuberculosis, yet tuberculosis in the developing countries is still on the high side. National Tuberculosis and Leprosy Control Programme (NTLCP, 2015) reported that 600,000 new cases of tuberculosis emerge in Nigeria which should alert all the citizens. Tuberculosis is a very deadly disease and not many people are aware of the potential danger they face daily from the disease given its highly infectious nature. Many infectious diseases have been eradicated and control in Nigeria through the use of proper health education intervention most especially the recent outbreak of Ebola Disease Virus. Adequate and proper health education and information on the spread, method of transmission, causes and prevention can go long way towards the curtail of this dreadful diseases. Therefore, this work examined the role and importance of health education and information as a tool towards eradication of tuberculosis in Nigeria.

### **Global Burden of Tuberculosis**

Tuberculosis still remains a widespread infectious disease, and nearly two billion people in the world i.e., one-third of the world's population have tubercular infection (WHO, 2014). The prevalence, patterns of presentation and mortality from TB have been known to vary from one country to another and from one region of a country to the other. This variation depends on prevailing social factors such as socio-economic status of the people, malnutrition, crowded living conditions, incidence of HIV/AIDS, level of development of health infrastructures, quality of available control programme and degree of drug resistance to anti-tuberculosis agents among other factors (Delock, 2008; Cancroff, Montorfano, & Wadhwa, 2010). Based on surveillance and survey data, there were an estimated 14.4 million

cases of TB out of which 9.2 million new cases of TB occurred globally in 2014 (139 per 100,000). These numbers include 4.1 million (62 per 100,000) new smear-positive cases and around 709,000 (7.7%) HIV – positive TB cases. In terms of incidence cases, India, China, Indonesia, South Africa and Nigeria rank first to fifth, respectively. The number of tuberculosis – related death continues to increase each year in developing countries, it still poses risk, especially to the immune – compromised section of the society. WHO (2015) outlines framework through which the 2050 goal of eradicating completely the scourge and burden of diseases in the world and the framework are;

1. Ensure funding for offering services of high quality
2. Focus on most vulnerable and hard – to – reach group
3. Pay special attention to migrants
4. Ensure vulnerable people are regularly screened for active and latent infections to prevent and manage outbreak.
5. Optimize multi-drug-resistant TB prevention and care
6. Ensure that there is no disruption in TB control programmes.
7. Invest in research and new diagnostic tools to support global TB control.

**Table 1.** Estimated epidemiological TB data in 22 high TB burden countries and WHO regions in 2014.

Country	Population 1000s	Incidence per 100,000 persons per year		Prevalence per 100,000 Persons (All forms)	Mortality per HIV prevalence 100,000 in incident persons per year TB cases % (All forms)	
		All form	Smear- positive			
India	1,151,751	168	75	299	28	1.2
China	1,320,864	99	45	201	15	0.3
Indonesia	228,864	234	105	253	38	0.6
South Africa	48,282	940	382	998	218	44
Nigeria	144,720	311	137	615	81	9.6
Bangladesh	155,991	225	101	391	45	0.0
Ethiopia	81,021	378	168	641	83	6.3
Pakistan	160,943	181	82	263	34	0.3
Philippines	86,264	287	129	432	45	0.1
DR Congo	60,644	392	173	645	84	9.2
Russian Federation	143,221	107	48	125	17	3.8
Viet Nam	86,206	173	77	225	23	5.0

Kenya	36,553	384	153	334	72	52
UR Tanzania	39,459	312	135	459	66	18
Uganda	29,899	355	154	561	84	16
Brazil	189,323	50	31	55	4.0	12
Mozambique	20,971	443	186	624	117	30
Thailand	63,444	142	62	197	20	11
Myanmar	48,379	171	76	169	13	2.6
Zimbabwe	13,228	557	227	597	131	43
Cambodia	14,197	500	220	665	92	9.6
Afghanistan	26,088	161	73	231	32	0.0
High-burden countries	4,150,313	177	79	286	32	11.0
APR	773,792	363	155	547	83	22
AMR	899,388	37	18	44	4.5	6
EMR	544,173	105	47	152	20	1.1
EUR	887,455	49	22	54	7.0	3.0
SEAR	1,721,049	180	81	289	30	1.3
WPR	1,764,231	109	49	199	17	1.2
Global	6,590,088	139	62	219	25	8

a All estimates include TB in people with HIV

b Prevalence of HIV in incident TB cases of all ages

APR, WHO African Region; AMR, WHO Region of the Americas; EMR, WHO Eastern Mediterranean Region; EUR, WHO European Region; SEAR, WHO South-East Asia Region; WPR, WHO Western Pacific Region.

### **Tuberculosis in Nigeria**

Tuberculosis is a major public health problem in Nigeria, being one of the ten leading causes of hospital admissions and a leading cause of death in adults, especially among the economically productive age group (National Tuberculosis and Leprosy Control Programme, 2010). Nigeria is ranked 4<sup>th</sup> among the 22 worst affected countries in the world and jointly top with South Africa in Africa. In Nigeria, Lagos state carries 84% of Nigeria. TB burden has consistently been responsible for about 11% of the causes of TB registered in Nigeria (Lagos State Ministry of Health, 2014)

WHO Global TB report (2011) reported that Nigeria has an incidence rate of 133 per 100,000 populations per year (210,000 cases). The estimated prevalence for Nigeria in the same report for all forms of TB is 199 per 100,000 populations per year (320,000 cases) and mortality rate of all forms of TB is 21/100,000 population (33,000 deaths per year). A rapid

increase in trend of TB cases notified was observed from 2002 when the country received the USAID and CIDA grants through WHO in support of DOTS expansion in the 17 non DOTS states at that time. Consequently, the number of TB cases notified increased from 31,164 in 2002 to 90,447 in 2010. Lagos, Kano and Ibadan, the three most highly populated states in Nigeria account for 18% of the cases notified in 2009 (NTBLCP, 2009)

The burden is compounded by high prevalence of HIV in Nigeria which stands at about 4.6% in the general adult population. The prevalence of HIV among TB patients increased from 2.2% in 1991 to 19.1% in 2001 and is currently estimated to be 28% in 2015 which indicates that TB situation will continue to be HIV – driven (Klint, 2011). The emergence of Multi Drug Resistant-Tuberculosis (MDR-TB) also poses a threat, which if not effectively addressed may wipe the achievements of previous efforts in controlling TB in Nigeria.

Nigeria established its National TB and Leprosy Control Programme (NTBLCP) in 1989. The NTBLCP operates along the three levels of government: National, State and Local Government Areas, with coordinating offices at each level. Health facilities at the peripheral level are the operational units of DOTS services. As of 2015, there were 3,455 health facilities providing free TB and DOTS services in Nigeria (Federal Ministry of Health, 2015). NTBLCP is responsible for facilitating policy design, development and implementation regarding TB control, support provision of tertiary care, mobilization of resources both locally and internationally, program evaluation and research, human resource development and technical support to state programmes. The overall goal of NTBLCP is to reduce significantly the burden, socio-economic impact, and transmission of TB and leprosy in Nigeria.

**Table 2.** Estimated tuberculosis burden in Nigeria.

<b>Estimated TB burden in Nigeria (2011-WHO Global TB Report)</b>		
	Estimates	Denominators
Estimated prevalence rate	199 per 100,000 population	All cases
Estimated incidence rate (All cases)	131 per 100,000 population	New cases
Registered TB cases (all forms)	90,311	
i. All new cases	92%	Reported cases
ii. Retreatment cases	8%	Reported cases
iii. New smear positive cases	50%	Reported cases
iv. Gender distribution		
Males	59.3%	
Females	40.7%	
Age distribution of TB cases		
i. 0-15years	2.8%	
ii. 25-44years	54%	
iii. 45-64years	43%	
Treatment success rate	84%	

World Health Organization Global TB report (2011), Nigeria.

All tertiary and most secondary health facilities have standard laboratories and the capacity to provide basic laboratory services including Acid Fast Bacilli microscopy for identification of pulmonary TB. The private sector (both for profit and non-profit), Non-Governmental Organizations, faith-based organizations, community-based organizations and local communities also provide considerable services at all levels of health care including TB care

### **Concept, Definition and Etiology of Tuberculosis**

Tuberculosis is a chronically infectious and notifiable disease produced by tubercle bacillus, *Mycobacterium tuberculosis*. (Ferrara & Meacci, 2005). It typically affects the lungs (Pulmonary TB) but can affect other sites as well (extra pulmonary TB) (WHO, 2014). The disease is spread in the air when people who are sick with pulmonary TB expel bacteria, for example by coughing. Tuberculosis occurs most often in crowded, inner city, economically disadvantaged environments and among people with other medical risk factors (Monahan & Neighbors, 1998; Klint, 2011).

Ferrara and Meacci (2005), state that a person with untreated, active tuberculosis can infect an estimated twenty other people per year. Transmission can only occur from people with active TB disease not latent TB infection (Nettina, 2006). The probability of transmission depends on infectiousness of the person with TB (quantity expelled), environment of exposure, duration of exposure, and virulence of the organism.

Pio and Chanlet, (2009), classified TB based on the site of the diseases and bacteriological status; 1. Pulmonary tuberculosis, sputum smear positive (PTB+) refers to a patient with at least two sputum specimen positive for acid-fast bacilli (AFB) detected by a microscope, or a patient with only one sputum specimen positive for AFB by microscopy plus radiographic chest abnormalities consistent with active pulmonary TB, or a patient with only one sputum specimen positive for AFB by microscopy and a culture positive for *Mycobacterium tuberculosis*. 2. Pulmonary tuberculosis, sputum smear negative (PTB-) refers to a patient with symptoms suggestive of TB, with at least two sputum specimens negative for AFB by microscopy and with radiographic chest abnormalities consistent with active pulmonary TB. 3. Extra pulmonary tuberculosis refers to a patient with tuberculosis of organs other than lungs: pleura, lymph nodes, abdomen, genitor-urinary tract, skin, joints and bones, and meninges.

Diagnosis should be based on one culture positive specimen, or histological evidence or strong clinical evidence consistent with active extra pulmonary TB. WHO (2004) categorized TB into the followings: 1. New case: A patient who has never taken anti tuberculosis treatment or has taken it for less than one month, 2. Relapsed case: A patient declared cured of TB by a physician but who reports back to the health service and is found to be bacteriologic positive, 3. Transferred in case: A patient who has been received into a tuberculosis unit or hospital after starting treatment in another unit where he has been recorded, 4. Default case: a patient who has received anti tuberculosis treatment for one month from any source and who has interrupted treatment for more than two months, 5. Failure case: an initial smear positive patients who remains smear positive at five months or more after starting treatment or an initial smear negative patient who becomes smear positive after completing a re-treatment regimen, and 6. Others: a patient who does not fit into any of the above categories.

Depending on the classification of TB, type of TB, severity of illness, history of treatment on the past, history of interruption in the treatment, the patient will be subjected to

categories of treatment. The drugs are to be taken on alternate days under direct observation (DOTS – Directly Observed Treatment, short-course) (WHO, 2007).

In summary, tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* that may affect almost any tissue or organ of the body. Tuberculosis radiology is used in the diagnosis of TB. It may also include a tuberculin skin test, a serological test, microbiological smears and cultures. Transmission can only occur from people with active TB via airborne spread. The chain of transmission can be stopped by isolating patients with active disease and starting effective anti-tuberculosis therapy.

The World Health Organisation declared tuberculosis a global emergency in 1993 and it remains one of the world's major causes of illness and death. One-third of the world's population, two billion people, carries the TB bacteria. According to United States Embassy, Nigeria ranks 5th among the 22 high burden TB countries in the world. WHO, (2010) estimated that 210,000 new cases of all forms of TB occurred in the country, equivalent to 133/100,000 population.

The WHO global surveillance and monitoring project in 2010, estimated the incidence in Nigeria to be around 320,000 prevalent cases of TB and 90,447 new smear positive cases per year. Tuberculosis can develop after inhaling droplets expelled into the air from a cough or sneeze by someone infected with *Mycobacterium tuberculosis*. The disease is characterized by the development of granulomas in the infected tissues (TB Alliance, 2015).

The risk of contracting TB increases with the frequency of contact with people who have the disease, with crowded or unsanitary living conditions and with poor nutrition. Factors that may contribute to the increase in tuberculosis infection in a population are: an increase in the number of homeless individuals (poor environment and poor nutrition), the appearance of drug – resistant strains of TB, incomplete treatment of TB infections. Individuals with immune systems damaged by AIDS have a higher risk of developing active tuberculosis, either from new exposure to TB or reactivation of dormant mycobacteria (Ferrara & Meacci, 2005).

### **Signs and Symptoms of Tuberculosis**

Signs examination of the lungs using stethoscope can reveal crackles, enlarged or tender lymph nodes may be presented in the neck or other areas, fluids may be detectable around the lung, clubbing of the fingers or toes may be present. Mario (2010) described signs and symptoms of pulmonary TB into two types, 1) constitutional symptoms; fatigue, anorexia, weight loss, long standing fever, night sweat, indigestion. Acute febrile illness, chills, flu like symptom, and 2) pulmonary signs and symptoms; cough progressing in frequency and producing mucous, hemoptysis, chest pain and dyspnea.

### **Diagnosis of Tuberculosis**

Demonstration of acid fast bacilli in the body fluids or tissues remains the gold standard for diagnosis of tuberculosis (WHO, 2011). In adults, the diagnosis of tuberculosis is based on:

1. Clinical symptoms and signs;
2. Sputum examination for AFB; and
3. Chest radiography. In children it is based on some direct and indirect factors taking into consideration such as the clinical features, history of tuberculosis contact, tuberculin

test, immunization status, chest radiography, sputum and gastric aspirate for AFB, and fine needle aspiration cytology from lymph nodes or other tissues.

### **Causative Agent, Mode of Infection and Incubation Period of Tuberculosis**

Tuberculosis in man is caused by non-spore forming, non-motile, pleomorphic, 2-4 inches long, acid fast, gram positive bacilli known as *Mycobacterium tuberculosis* in almost all cases (WHO, 2015). Occasionally, it is caused by the bovine strain known as *Mycobacterium bovis*. The turnaround time from obtaining a clinical specimen to identification takes around 7-10 weeks, and can be attributed to the slow growth and long generation time (15-20 hours) of the *Mycobacterium*.

The TB infection is spread through a tuberculosis patient whose sputum is positive for acid fast mycobacterium bacilli and has an extensive fibrocavitary disease. Usually, adults and older children with active pulmonary tuberculosis act as the source of infection. Young children rarely spread TB because the small amounts of tubercle bacilli in the endo-bronchial secretions and poor coughing force are not sufficient enough to suspend infectious particles of adequate size in the air (Holger, 2012). The infected sputum dries up and the bacilli are re-suspended in the dust and air. These are then inhaled through breathing. The infection may also be transmitted through skin and mucous membrane, either transplacentally or by coming in direct contact with infected discharge or a contaminated fomite.

Incubation period between infection and tubercle reactivity varies between 3 weeks to 3 months. Incubation period between asymptomatic infection and the development of disease ranges from one month to one year. In most cases, the infection may become dormant and never develop into a clinical disease.

### **Risk Factors of Pulmonary Tuberculosis**

Tuberculosis can develop after inhaling droplets sprayed into the air from a cough or sneeze by someone infected with *mycobacterium tuberculosis*. The disease is characterized by the development of granulomas (granular tumors) in the infected tissues. There are factors that contribute to the increase in the role of tubercle bacillus, the risk of progression from infection to disease and risk of death among TB patients. Lienhardt (2001) classified risk factors of TB into three main types:

#### **Host related factors**

Host related factors in the causation of tuberculosis are intrinsic factors in individuals which make them susceptible to TB (Adelayi, 2009). HIV infection, diabetes, smoking, alcohol use and malnutrition are controllable, while age, sex, race and gene are uncontrollable risk factors. WHO (2010) stated that host related factors are conditions modifying the balance established in the body between the tubercle bacilli and the host immune defenses. These include any condition causing immunosuppression (that is, use of oral/injectable steroids, HIV infection, chemotherapy and radiotherapy); the presence of co-morbid (diabetes, hepatitis, asthma, measles and chronic renal disease) which often predisposes individuals to TB infections (Odelola & Lateef, 2013).

### **Socio-Economic Factors and Environmental Risk Factors of Tuberculosis**

Socio-economic factors of poverty, occupation also serve as risk factors of tuberculosis. Poverty is an important risk factor of TB and AIDS. Diseases and health conditions that are more prevalent among poor are sometimes described as disease of poverty. Such diseases include TB, AIDS and malaria. Two billion people live in urban slums and other difficult habitats; in which that live are characterized by harsh environmental conditions-overcrowding, poor ventilation, and poor nutrition. Occupation is also a risk factor of TB which contributes not only to the risk of tubercle bacillus, but also to the risk of progression from infection to disease. Occupational risk of tuberculosis is the probability of acquiring tuberculosis infection or active tuberculosis as a result of work place exposure. This varies with job category and work environment (National Academy of Science, 2012). According to Murray, (2008) exposure to silica dust is a risk factor for the development of Pulmonary TB. The risk of PTB increases with the presence of silicosis and with quartiles of exposure to dust. Health care workers may also be exposed to the tuberculosis bacteria by taking care of patients with tuberculosis who have the bacteria in their sputum.

Overcrowding is also a common environmental factor that contributes the tuberculosis. Overcrowding increases the risk of exposure to an infectious tuberculosis case and therefore the risk of infection. However, progression to disease might be enhanced by other factors modifying the host's immune defenses such as, malnutrition. The deficiency on housing quality, building materials, dilapidated state of infrastructure and a poor maintenance culture has aggravated the spread of disease and risk in healthy living standards of the vulnerable masses especially in impoverished regions within the country (Odelola & Lateef, 2013)

### **DOTS and Stop Tb Programmes in Nigeria**

Recognizing the magnitude of the problem of TB, targets for reduction of the burden of TB disease (measured as incidence, prevalence, mortality and socio-economic impact) have been set within two global frameworks (WHO, 2011). According to WHO, these goals are (1) Millennium Development Goals (MDGs) and (2) Stop TB initiatives. Goal 6 of the MDG addresses three public health diseases of global importance. This goal aims at combating HIV/AIDS, malaria and other related disease which include TB. In addition, MDG has specific targets (6c) to measure global performance of TB control and two indicators (6.9 and 6.10) for this purpose.

**Table 3.** Goals, targets and indicators for TB control

MDG reference	Indicator
MD 6: Combat HIV/AIDS, malaria and other diseases:	
Target 6.C	Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
Indicator 6.8	Incidence, prevalence and death rates associated with tuberculosis
Indicator 6.9	Proportion of tuberculosis cases detected and cured under DOTS (the internationally recommended strategy)

<i>Stop TB partnership targets:</i>	
By 2005	At least 70% of people with sputum smear-positive TB will be diagnosed (i.e under the DOTS strategy), and at least 85% cured. These are targets set by the World Health Assembly of WHO.
By 2015	The global burden of TB (Per capital prevalence and death rates) will be reduced by 50% relative to 1990 levels
By 2050	The global incidence of active TB will be less than 1 case per million population per year.

MDG, Millennium Development Goal

Based on analysis of current situation of TB in Nigeria and in line with internationally recommended standards, six strategic approaches have been adopted by Nigeria stop TB partnership aimed at reducing the burden of TB. Each strategic approach has sub-components that contribute to the priority intervention areas. These are:

**Strategic Approach 1: To pursue high quality DOTS expansion and enhancement through**

- (a) Improved political commitment measured by sustained financial allocation, approval and release for TB care and control
- (b) Ensuring early case detection and diagnosis through quality assured bacteriology
- (c) Provision of standardized TB treatment and prevention regimen with supervision and patient support.
- (d) Ensuring an effective drug logistics and supply management
- (e) Effective monitoring and evaluation system based on performance and impact assessment.

**Strategic Approach 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 population

**Strategic Approach 3: Contribute to health systems strengthening based on primary health care**

- (a) Support improvement in national state health policies and plan, human resources development, health financing and supplier, service delivery and information.
- (b) Strengthen infection control in health facilities, congregate settings and household
- (c) Increase and upgrade number of laboratories and other networks providing investigative TB services
- (d) Adopt and adapt successful innovative approaches from other fields, programme areas or sector to foster better action on the social determinants of health

**Strategic approach 4: Engage all stakeholders and care providers**

- (a) Involve all public, voluntary, corporate, communities, private providers and individuals through public private mix approaches
- (b) Promote use of international standards for TB care

**Strategic Approach 5: Empower people with TB, and communities through partnership**

- (a) Continuously pursue advocacy, communication and social mobilization activities
- (b) Foster community participation in TB care, prevention and health promotion

**Strategic approach 6: Enable and promote research**

- (a) Support the conduct of programme – based operation research
- (b) Advocate for, participate in and use evidence – based researched developed on new TB diagnostic, anti-Tb drugs and vaccines.

Stop TB initiatives (STBI, 2014) proposed that to scale-up these interventions, the strategic requirements are:

- Strong and persistent advocacy to promote, implement, scale-up and allocate resources in order to achieve internationally agreed goals and targets
- Strengthen the health system by building the capacity of critical mass at all levels of health sector and reducing the bottlenecks for access, availability, continued utilization of high quality TB services to achieve total coverage
- Empower household and communities especially the poor and vulnerable groups to provide TB care and control services
- Promoting strong operational partnerships to take promising interventions to scale with government at all levels, NGOs, private health providers, donor agencies, implementing partners, corporate organizations, communities and individuals in joint programming, co-funding and providing technical support services.

## **2. TREATMENT AND PREVENTION OF TUBERCULOSIS**

Treatment regimens are divided into the initial or intensive phase and the continuation phase. There is a standard code for TB treatment which uses an abbreviation for each anti-TB drugs.

- 1). Intensive/initial phase: during the intensive/initial phase the bactericidal effect of treatment leads to rapid bacteriological sputum conversion and improvement of clinical symptoms, the pulmonary TB patient must take the medicines every day for 3-4 months (Pio & Chaulet, 2007).
- 2). Continuation phase: during the continuation phase, the patient takes the medicines 3 times a week for 5 months, the sterilizing effect of the therapy eliminates remaining bacilli and prevents relapse (Pio & Chatter, 2007).

There are five essential anti-TB drugs used for treating TB Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), Streptomycin (S), and Ethambutol (E), and there are three main

properties of anti-TB drugs bactericidal ability, sterilizing ability and the ability to prevent resistance. Isoniazid and Rifampicin are the most powerful bactericidal drugs, active against all types of TB bacilli. Pyrazinamide and Streptomycin are also bactericidal effective against only certain types of TB bacilli. Pyrazinamide is active in an acid environment against TB bacilli inside macrophages while Streptomycin is active against rapidly multiplying TB bacilli (WHO, 2006).

Complying to the drug regimen is critical for success. Directly observed therapy (DOT) is cost-effective for patients at high-risk for non-adherence, and should be used in all cases, chemotherapy can be successful only within an appropriate health system infrastructure which addresses both the clinical and social management of patients and their contacts (Christopher et al., 2003).

**Table 4.** Treatment for pulmonary TB patient (WHO, 2006).

Treatment category	Type of TB Patient	Intensive Phase	Continuation Phase
I	<ol style="list-style-type: none"> <li>1. New smear positive pulmonary TB</li> <li>2. New smear negative pulmonary TB seriously ill</li> <li>3. New extra-pulmonary TB seriously ill</li> </ol>	2(ERRZ) 3(24 doses)	4(IIR) 3(54 doses)
II	<ol style="list-style-type: none"> <li>1. Sputum smear positive relapses</li> <li>2. Sputum smear positive treatment failure cases</li> <li>3. Sputum smear positive cases, treatment after default</li> <li>4. New smear negative pulmonary TB not seriously ill</li> </ol>	2(SEHRZ) 3+ I (EHRZ) 3(24+12 doses)	5(HRE3) (66 doses)
III	<ol style="list-style-type: none"> <li>1. New smear negative, extra- pulmonary TB, not seriously ill</li> </ol>	2(HRZ)3 (24 doses)	4(HR)3 (54 doses)

Note: Prefix is number of months and suffix is number of doses in a week H-Isoniazid B-Ethambutol R-Rifampicin S-Streptomycin Z-Pyrazinamide.

Ethambutol is a bacteriostatic drug used in association with more powerful bactericidal drugs to prevent the emergence of resistant bacilli (WHO, 2003). The major principles for TB treatment are as follows: drug treatment is an individual and a public health measure, regimens must contain multiple drugs to which organisms are susceptible, and drug must be given for a sufficient period of time, (Nettina, 2006).

Some pulmonary TB patients do not complete taking the anti TB medications because they feel better, but many pulmonary TB patients fail to follow the treatment medications because they can not tolerate the side effects of the medications. Lee et al, (2002) studied the risk factors for hepatotoxicity associated with rifampin and pyrazinamide for the treatment of latent tuberculosis infection: in three public health tuberculosis clinics and they found that of 148 patients prescribed 2RZ, 85 patients (57.4%) completed therapy, and grade 3 or 4 hepatotoxicity occurred in 14 patients.

**Table 5.** Side effects of TB medications (WHO, 2005).

TB drugs	Side effects
Isoniazid (INH)	tingling or pain in hands and feet (neuropathy), nausea and vomiting, skin rash, fever, <i>may</i> cause liver problems (hepatitis), psychosis
Ethambutol (E)	skin rashes, eye problems such as blurred vision nausea and vomiting, headaches, dizziness joint pain
Rifampicin (R)	nausea and vomiting, diarrhea, skin rash, anemia, liver problems (jaundice), fever, flu like symptoms, body fluids orange
Streptomycin (S)	vestibular and auditory nerve damage, renal damage, coetaneous hypersensitivity, pain, skin rash, indurations at injection site
Pyrazinamide (Z)	joint pain, arthralgia, hepatitis, coetaneous reactions sideroblastic anemia, gastrointestinal problem

Tuberculosis is a disease that is easily transmitted through the air when an infectious person speaks, laughs and coughs. Hilbert (2011) asserted that tuberculosis can be prevented in the following ways;

- (1) Avoid exposure to people with active TB: obviously the most important precaution to be taken to prevent TB is to avoid being around people with active TB, which is highly contagious.
  - Do not spend long periods of time with anyone who has an advice TB infection, especially if they have been recovery treatment for less than two weeks. In particular, it is important to avoid spending time and TB patients in warm, and stuffy rooms.
  - If you are forced to be around TB patients, for example if you work in an death care facility where TB is currently being treated, there is must be prompt compliance with the usage of personal protective equipment, such as wearing a face mask, to avoid breathing in the TB bacteria.
- (2) Determine risk factors: certain groups of people are considered to be more at risk of developing TB than others. The groups with high risk are stated as follows:
  - People with weakened immune system, such as those with HIV or AIDs.
  - People who live with or care for someone with active TB, such as a close relative or a physician.
  - People who live in crowded, confined spaces such as prisons, homeless shelter or internal displaced people's camp (IDPC).
  - People who live in or travel to countries where active TB is common such as Nigeria, India, Pakistan and host of other countries.

(3) Live a healthy lifestyle: People who are in poor health are more susceptible to the TB infection, as their disease resistance is lower than in healthy people. Therefore, it is important to live a healthy lifestyle such as;

- Eating a healthy, adequate diet with plenty of fruit, vegetables, whole grains and lean meat. Avoid fatty, sugary and processed foods.
- Exercise often by incorporating some cardiovascular exercise into your workout, such as running, swimming or rowing.
- Cut down on alcohol consumption and avoid smoking or taking drugs.
- Maintain good personal hygiene and try to spend as much time as possible outdoor in the fresh air.

(4) Get the BCG vaccination to prevent TB: The BCG (Bacille Calmette – Guerin) vaccine is used in many countries such as High burden countries (HBC) to help prevent the spread of TB, especially among small children.

### **3. DEALING WITH TREATMENT PROBLEMS IN NIGERIA**

The treatment of TB has constituted a major problem in Nigeria for several reasons. First, a lot of people with TB are still not detected and they are not able to access the treatment. Second, the number of new cases of TB is increasing in the country because of the epidemic of HIV/AIDS. Third, getting the TB programme to provide drugs and other TB services to all the communities has been facing strong challenges despite the efforts of government and nongovernmental organisations. Fourth, awareness among the communities, especially the leadership of the communities and the citizens about TB, its manifestation, its causes and modalities for treatment is poor. Fifth, low socio-economic status, overcrowding, malnutrition, poor ventilation and contact with people with already infected people are still a major identifiable risk factors in development of pulmonary TB in this environment. Sixth, poor adherence to medication and treatment is a major issue like in all other parts of the world. Long distance to the hospitals which limits the chances of patients' financing their treatment, lack of facility for home visit in most cases and poor supervision in under-aged children are some of the contributing factors for high treatment default rate which often results in the development of multidrug resistant TB.

HIV/TB co-infected patients are more likely to default from treatment as they experience progressive deterioration in their health status when compared to other patients. Okeke and Aguwa (2007) has found out that the private practitioners in Nigeria do not often effectively implement the DOTS programme, particularly in areas such as political commitment, case detection through sputum smear microscopy, standardized treatment for 6-8 months, uninterrupted drug supply and standardized recording and reporting system. Delay in seeking treatment has been reported to occur in as much as 83% of patients in Lagos. This is dangerous since it has been estimated that every case of TB can infect about 12 to 15 other citizens. Anecdotal evidence indicates that the free drugs for TB patients do not often reach many patients in the northern part of the country due to corruption in the implementation of DOTS. In addition to the above problems, many States in the northern part of the country have peculiar problems.

Qualified pharmacists are not directly involved in the distribution of drugs to the patients in some States and the health professionals engaged in the distribution frequently divert the drugs to patent and propriety medicine store license holders for sale.

Despite the various short comings in the implementation of DOTS programme in Nigeria, improvement in treatment success has been recorded in the last couple of years. According to WHO, TB case detection rate has increased from 15.3% in 2001 to 27% in 2005. The treatments success rate for new smear-positive cases treated under DOTS which declined from 65% in 1994 to 32% in 1996 has remained above 72% since 1997 even though the success rate in Nigeria is still lower than those in some African countries including Ethiopia, Kenya, Mozambique, and DR Congo.

#### **4. HEALTH EDUCATION AS A TOOL FOR ACHIEVING TUBERCULOSIS FREE COUNTRY**

Health is an important aspect of human life. It encompasses all activities aimed at ensuring the protection of the body from disease and promoting good habit. WHO (1947) defined health as the complete state of physical, mental and social well-being of individual and not mere the absence of disease or infirmities. To achieve all these variables of making individual healthy, health education has an important role to play. Making high quality services widely available and accessible to all those who need them, the role of health education as a tool is indispensable. Addressing TB/HIV, MDR-TB and other challenges requires much greater action and input than DOTS (Murray, 2008).

Health Education is defined as any combination of learning experience designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes (WHO, 2008, Johnson, 2010). Adeyanju (2009) further define health education as the sum total of all activities put in place in order to create and raise awareness about health so as to make informed health decision. Despite efforts from the Federal Government, WHO and other health stakeholders in Nigeria, tuberculosis and other infectious diseases continue to increase (Oyewole, 2008). Tuberculosis awareness and education on the private and television is not encouraging even at the primary health care level which often time allow patients who are well equipped with the rightful information continue to spread the TB disease. Delick (2009) also stated that lack of drug adherence and compliance among patients who either gave one reason or the other for not complying with the regimen, also makes it difficult for the TB infection and disease to be eradicated. Health education can serve as a tool to mobilize people and educate people on simple ways to prevent themselves against the invasion of micro-organism which cause infection. The role of health education is to convince the community and individuals of the importance of health and services rendered by DOTS centers.

Health Education can be used to eradicate TB in the following ways;

- Improve the health of TB patients: Health education helps TB patients to improve the health in all stages of life. This can be achieved by visiting communities, health centers, DOTs centers, giving them health talk as well as voluntary counseling on how to improve health and live a disease free life. It will also help the patient to adhere strictly to their regimen, using of face mask when with visitors and living a hygienic life will all help to reduce and eradicate tuberculosis.

- Improve decision-making: It helps people to make better health decision to do so, the health educator often tailors their message to the group they are educating. It explains the risks of unhealthy habit like smoking, excessive alcohol consumption and unprotected sex which can predispose one to a TB infection.
- Fight disease: - The goal of health education is to minimize or eradicate the occurrence of life-threatening illness in which TB is among. For example, the risk of tuberculosis can be lessened with proper hygiene and good diet.
- Fight misconception: Health education helps to correct some misconception that affects people's health. For example, in the Northern part of Nigeria, where people believed that immunization and vaccination is a means of putting an end to child bearing.
- Provide resources: Health education provides educational resources in the form of fliers carrying health message on the causes, signs and symptoms, prevention and treatment of TB disease. It also creates awareness on health services that are available for free or at minimal costs such as the DOTS initiative

## **5. CONCLUSION**

Although TB is a worldwide problem, Nigeria is one of the few countries in the world with the highest prevalence rate. With the implementation of DOTS programme in Nigeria, there has been in improvement in treatment success recorded in the last couple of years. Nevertheless, the treatment success is far revised fall short of the WHO set targets, including case detection, prevention and treatment rate. Several challenges, including health education, monitoring and funding are currently inadequate and makes the scourge of tuberculosis to be on the high side.

Health Education intervention is needed at the DOTS centers, every household and given through the media so as to create awareness on TB battling our country. This health education will help to prevent the disease whereby people will come out when they have the symptoms and signs of the disease this will improve the detection rate and also make people live hygiene life and reduce the spread of TB. With implementation of the stop TB strategy and adequate health education, tuberculosis will be reduced in Nigeria.

## **Recommendation**

Health Education and TB strategy will be key factors towards reducing the scourge of tuberculosis in Nigeria if the following recommendations are taken cognizance of. They are as follows:

- Government should implement health education as part of the DOTs, this will thus empower the tuberculosis patients on ways to live healthy, lifestyle. In doing this, they will recover fastly and prevent them from spreading the disease.
- Health education and awareness on tuberculosis symptoms, signs and prevention should be made available and accessible to the general public.

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