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## **INCIDENCE OF PULMONARY TUBERCULOSIS (PER 100,000 PEOPLE) IN NORTHERN GHANA (A RETROSPECTIVE STUDY AT THE TAMALE TEACHING HOSPITAL, 2004-2012)**

**YAHAYA A. , S.E.K AQUAH, K SAGOE**

### **ABSTRACT**

This retrospective study was intended to report the improved detection rate and also the incidence of pulmonary tuberculosis at the Tamale Teaching Hospital of Northern Ghana.

Sputum smear microscopy for acid fast bacilli (AFB) results of newly suspected pulmonary tuberculosis (Diagnosed Clinically) was analysed for the study. Patients and their demographic data, comprising age, and sex recorded from January 2004, to December 2012, were retrieved from the chest clinic and laboratory register (TB04) of the bacteriology unit and analysed.

Out of a total of 5,720 cases registered 4,762 (83.3%) were new patients with clinically diagnosed PTB. This comprised of 2,766 (58.1%) males and 1,996 (41.9%) females giving a female to male ratio of 1:14. Assessment of recorded data for newly suspected PTB patients rose from 165 (9.9%) in 2004 to 948 (19.9%) in 2009.

Out of a total of the 4,762 clinically diagnosed (reported) cases 620 were sputum smear positive, yielding positivity rate on a year to year basis, was 15.7% (2004), 15.8% (2005), 13.4% (2006), 12.7% (2007), 20.6% (2008), 10.0% (2009) and 6.3% (2010).

The median age for recorded cases was 42 years. Generally the percentage proportion of confirmed PTB stratified by age showed a steady rise from 0.3% in <5 years age group and peaked at 16.3% in 30 – 35 years age group from 10.0% to 4.8% in 54 – 59 years age group.

There has been a remarkable improvement in diagnostic request for suspected TB patients; the decline in positivity rate might have been impacted upon greatly by the national strategy to stop TB which emphasized on active case finding and prompt reporting at the community level, improving diagnostic processes and strengthening the health systems. The rapid urbanization and changes in the social background of the inhabitants of the Tamale Metropolitan Area (TMA) cannot be overemphasized.

**Keywords: Tuberculosis, Diagnosis process**

### **BACKGROUND**

Tuberculosis (TB) is an old disease but one which health workers all over the world are finding harder and harder to control. The World Health Organization (WHO) in 1993 declared TB a global emergency in recognition of this disease a public health problem. In August 2005, TB was declared an African emergency. About one-third of the world's population is infected by mycobacterium, TB.

Worldwide, in 2000, there were about 8.7million cases of TB diseases with 1.9million deaths. Mycobacterium Tuberculosis kills more people than

any single infectious disease agent. Death from TB accounts for twenty five percent of all avoidable deaths, in developing countries.

Of most cases, in some developing countries, 75% are in the economic productive age (15-50) years. HIV is fueling TB epidemic; In the year 2000, 1/3<sup>rd</sup> of HIV infected persons worldwide (about 13 million people) were also infected with M> tuberculosis, 50% will become sick with TB during their life time; 10% will become sick per year. Thus, the prevalence of HIV in a community has an important effect on the incidence of TB; HIV poses as fuel to the epidemic of tuberculosis in any community.

According to Professor Hesse, without treatment, 50% patients with pulmonary TB will die within 5 years while 25% remains with chronic infectious TB; the other 25% will spontaneously recover and be healthy as a result of their strong immunity.

It is estimated that Ghana has 125 smear positive pulmonary TB cases per 100,000 population and 281 of all types of TB cases per 100,000 populations per year. This means that with a population of about 25 million, we should expect about 25,000 smear positive pulmonary TB cases and 56,000 new TB cases of all types. Every year, with about 12,000 deaths.

However, only about a fifth of these cases (12,000) are reported in this country every year; according to (2007-2010) TB – CAP reports, by Rehab Chimzizi. This is because of the following reasons:

- (i) Many people with TB do not report to health facilities;
- (ii) Those who report to our health facilities are not diagnosed as TB (miss diagnosed);
- (iii) Not all diagnosed cases at the health facilities are captured by the disease surveillance system; and
- (iv) Most TB patients are adults in the most productive age group and this adversely affects the national and family economy. (Reports from TB Control Assistance Program (TB CAP) – Ghana (2007-2010))

### **Research problem**

Although Ghana is not one of the 22 TB high burden countries, the disease remains a major public health problem in the country. The WHO estimates that Ghana should be reporting at least 45,000 TB cases on an annual basis but only one third of the cases are detected. This means that many more undiagnosed TB in the communities are continuously transmitting the disease to susceptible people. The gap is that the incidence and detection rate of pulmonary Tuberculosis at the Northern part of Ghana has not been documented, as yet in literature.

Over the past seven years funding for tuberculosis control from the government of Ghana (GOG) and the global fund to fight AIDS, Tuberculosis and malaria (GFATM) has increased significantly; however the fight against TB is far from being won.

Unprecedented financial as well as human resources are required to transform the fight towards eliminating tuberculosis in Ghana.

TB CAP was one of the global USAID funding mechanisms to contribute to achieving or exceeding the 70 percent TB detection rate and reducing the burden of HIV among TB person living with HIV (PLHIV) on the other. Contributing to health systems strengthening was also a priority area. From 2007, TB CAP commenced the provision of high quality technical assistance to the Ghana health service aimed at addressing key challenges facing the national tuberculosis program in Ghana. (Report at stake holders meeting, 2010). The meeting was well attended all regional directors of health service (of the ten regions of Ghana and institutional TB coordinators of the three: hospitals namely Korlebu Teaching Hospital, KTH and Tamale Teaching Hospital. Doctor George Amofah was there, in place of Director General of GHS.

Dr. George Amofah also spoke of GFR5 grant closure and OIG activities. The overview of TB control in Ghana was delivered by Dr. Frank Bonsu PM, NTP. Whereas; the implementation of M and E frame work in Ghana was delivered by Dr. Anthony Ofori PPME. Dr. Rhabab Chimzeze, a TB adviser talked on TB care and dissemination mortality. Each regional and institutional representative was given 15 minutes to present on interventions undertaken, outcomes, best practices, innovative, strategies to improve TB case detection and then work plan on TB control for the 2011. He said Ghana had more TB than was reported.

That year's review focused on strengthening monitoring and evaluation as the foundation of improved programme management. This is towards implementing the round ten fund grant.

That grants aims at systematic quality improvements of TB control in Ghana. In the year under review regions were asked to introduce innovative strategies to improve TB case detection (Rhabab Chimzeze 2010).

### **Current situation**

Tuberculosis (TB) is a major public health problem in Ghana.

- An estimated 20,000 people developed active TB in 2011, of those; around 22% were not detected and notified.
- The problem of case detection is a priority in Ghana's national tuberculosis health sector strategic plan, 2009 – 2013.
- The TB mortality rate remains high at about 7.5 per 100,000.

#### **The WHO-CIDA initiative in Ghana**

- The initiative began in 2009, with the aim of addressing the low case detection.
- The capital city of Accra is the focus for project activities.
- The initiative aims to detect 15% additional TB cases (3040 TB cases) over the period 2009, to 2013.

“Ghana has twin objectives of increasing case detection and linking hospitals to the national TB control programme through this initiative.” (Dr. Frank Bonsu, National Tuberculosis Control Programme Manager, Ghana).

#### **Research question:**

- What is detection rate of PTB in Northern Ghana (TMA)
- What are the barriers to detection and early intervention of TB management
- What is the incidence of TB in northern Ghana, 2004 – 20012?

#### **Literature review:**

The incidence of tuberculosis (Per 100,000 people) in Ghana was last reported at 86 in 2010, according to the World Bank report published in 2012. Incidence of tuberculosis is the estimated number of new pulmonary, smear positive, and extra-pulmonary tuberculosis cases. This page includes a historical data chart, news and forecasts for incidence of tuberculosis in Ghana.

The WHO stop TB department together with WHO regional and country offices, developed policies, strategies and standards; support the efforts of WHO member states; measures progress towards TB targets and assesses national programme performance, financing and impact; promotes research and facilitates partnerships, advocacy and communication

1577 TB cases were detected and started on treatment in the first 18 months of implementation.

Over 50% of the target set for the project has been reached in eighteen months of operation.

Over 70% of additional TB cases were contributed by ten engaged hospitals, there was also a 60% increase in the number of people screened for TB in hospitals.

From a negligible number of contacts being investigated before the start of this initiative, 92% of index TB cases had their contacts listed and 76% of contacts listed were screened for TB between 2010-2011.

Pharmacy engagement and screening of diabetics began in the fourth quarter of 2010 and show potential for scale-up (WHO update 2012).

## **MATERIALS AND METHODS**

### **Study design and site:**

This hospital-based retrospective study was conducted at the Tamale Teaching Hospital (TTH) and comprised of review of available data from January 2004 to December 2012. TTH is a 340 bed complement hospital situated in the Northern Region of Ghana. In addition to offering clinical care to inhabitants of the Tamale Metropolis and its surrounding districts, it also serves as a referral hospital to the two Upper Regions (Upper East and West) of Ghana. The hospital runs six clinical departments including the chest clinic/ward which attends to patients complicated respiratory tract infections including TB cases visiting the hospital from the metropolis, surrounding districts and catchment areas beyond the region.

### **Data extraction:**

Data comprising age, sex and results for Ziehl-Neelsen stained sputum smear microscopy for acid fast barcilli (AFB) of all recorded cases from January 2004 to December 2012 were retrieved from the TB laboratory register (TB04) of TTH bacteriology laboratory. From the recorded data information about patients for who diagnoses has been requested for the first time were retrieved; these were classified as new suspected TB. Repeated cases and patients requesting follow-up test were excluded from the analysis.

### **Case definition:**

A case of pulmonary TB was classified as positive (confirmed case of PTB) if at least one of the two/three smears from the two/three sputum specimen received was AFB positive and quantified as being scanty, 1+, 2+ and 3+ AFB present. New patients for the purposes of this study were defined as patients who were not on TB treatment.

#### Data analysis:

Data retrieved were entered into SPSS and analyzed. Descriptive statistics was employed to explain the general distribution of data. Categorical variables were compared using Chi-square test where appropriate.

#### Results:

A total of 5,720 cases were registered during the period under study in the TB 04 register at the laboratory, out of which a total of 4,762 new patients with suspected pulmonary TB (diagnostic) were screened for AFB. More males reported with symptoms of pulmonary TB compared to females for the periods under review. Males comprised 2,766 (58.1%) and females 1,996 (41.9%) giving a male ratio of 1:1.4. (Table 1).

Table 2 represents the yearly age variables among the patients from 2004 to 2010. The median ages for

newly suspected cases ranged from a least of 40 years in 2006 and 2007 respectively to a maximum of 44.5 in 2010. The study recorded a minimum age of one (1) year and a maximum age of 102 years in the years under review with inter-quartile (IQR) age spanning from 27 years to 70 years.

In total 620 of the 4,762 suspected cases examined were acid fast bacilli positive representing cumulative positivity rate of 13.0%. when stratified into the respective years, the positive rates were as follows: 15.7% (74/471) in 2004, 15.8% (66/416) in 2005, 13.4% (66/494), in 2006, 12.76% (78/616) in 2007, 20.6% (183/890) in 2008, 10.0% (95/948) in 2009, and 6.3% (58/927) in 2010, the portion of suspected cases to smear positives was 7:1, implying that for every seven new suspected pulmonary TB patients screened, there was one smear positive for the period under review. The general trend showed a gradual decline in the proportions of smear positives from 2004 (15.7%) to 2010 (6.3%), with the exception of 2008 which showed a sharp rise in smear positive cases (20.6%).

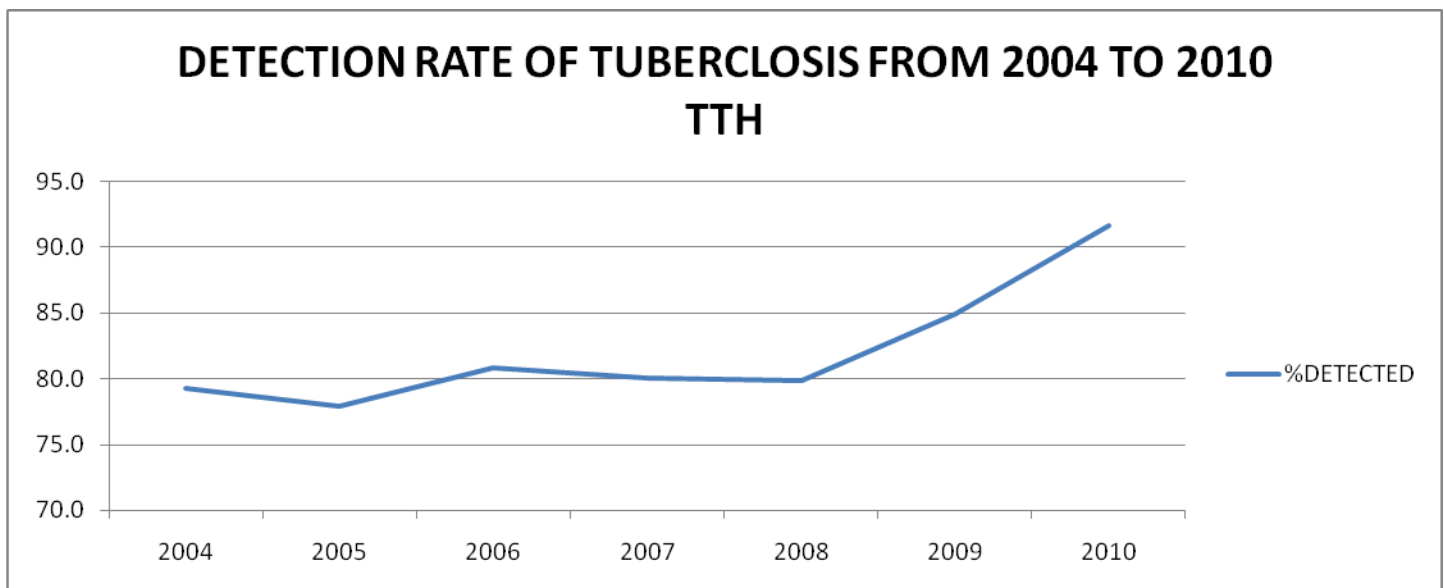
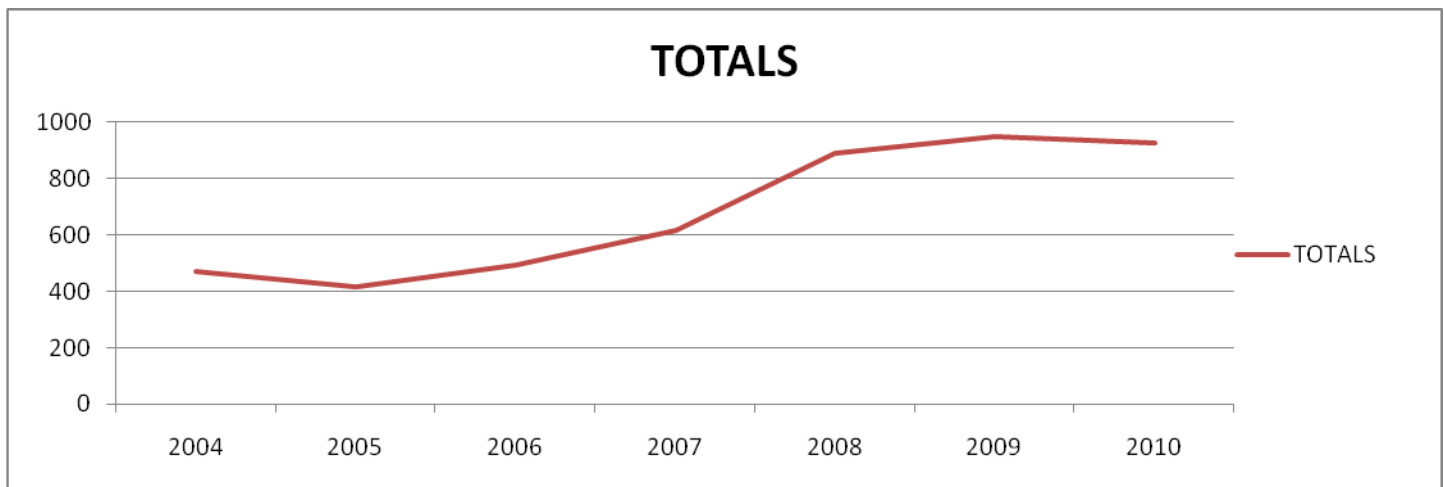
For the years under review, dominance in male smear positivity was observed over that of female. Out of the 620 smear positives, 383 (61.8%) were males giving a male ratio of 1.0:0.6. a marked rise in the proportions of smear positives in females (46.4%) was observed in 2008.

Table 1: General overview of TB cases examined within the years under review

New suspected cases				
Year	Total Registered Cases	Male	Female	Total
2004	594	306(65.0)	165(35.0)	471
2005	534	277(66.6)	139(33.4)	416
2006	611	310(62.8)	184(37.2)	494
2007	770	348(56.5)	268(43.5)	616
2008	1114	496(55.7)	394(44.3)	890
2009	1117	543(57.3)	405(42.7)	948
2010	1012	486(52.4)	441(47.6)	927
<b>Total</b>	<b>5720</b>	<b>2766</b>	<b>1996</b>	<b>4762</b>

Table 2: Age stratification for reviewed cases in suspected TB patients

Year Under Review							
Age	2004	2005	2006	2007	2008	2009	2010
Minimum year	1	5	2	6	1	1	1
Median year	42	44	40	40	42	44.5	41
Maximum year	100	90	95	92	95	90	102
IQR year	27-60	32-60	30-56	27-60	29-65	29-70	27-65



**Discussion:**

Ghana introduced a National Tuberculosis Control Program (NTP) in 1994, based on the Directly Observed Treatment, short-course (DOTS) strategy. To date, the strategy has been implemented throughout the country with coverage of over 80.6% (WHO, 2005). However, a decade after implementation of the strategy, the incidence of TB is still high and increasing alarmingly (NTP-Ghana, 2004). One major setback to the successes of the strategy globally, particularly for case finding and treatment adherence, is the stigma attached to TB in most societies, including Ghana (Balasubramanian, Muniyandi, Geetharamani, Thresa, & Venkatesan, 1999; Lawn, 2000; WHO, 2003). Consequently, there has been an increased interest in understanding TB stigma to enable the development of appropriate interventions to minimize the impact of stigma (Heijnders & Van der Meij, 2006; Weise, Ramakrishna, & Somma, 2006).

Failure to achieve the expected detection rate, in the previous years, in TTH, has been explained as the impact of stigma attached to TB in Ghana (Dordor et al., 2008). As a result of the attitudes and behaviour of, not only community workers, but even health workers themselves. TB patients are discouraged from coming out to health centers for early diagnoses and treatment. For fear of stigmatization and discriminative attitudes and behavior from health workers and the communities they belong to.

The concept of stigma has been defined in many ways; there are clear indicators of its social origins as well as the factors that perpetuate it (Smith, 2002). The process of constructing stigma involves the recognition of a difference based on some distinguishing characteristics values placed on varying social identity, and subsequent devaluation of the person who possesses them (Crocker, Major, & Steel, 1998; Dovidio, Major, & Crocker, 2000; Goffman, 1963; Jones et al., 1984 Link & Phelan, 2001). Thus, any discussion of socially inferior attributes to, must take in to consideration an identification of what is discrimination and stigma community members will not voluntarily walk to health care centres or hospitals for screening or even free treatments. Tb patients will not adhere to treatment protocol because she does not want to be associated with the “deadly disease”.

Although the social norm, since stigma is generally associated with those inferior attributes which are commonly regarded as non infractions (Page, 1984). For TB, it has been documented that the attached stigma can be a reflection of the way society understands the disease (Bennstam, Standmark, & Diwan, 2004; Rajeswari, Muniyandi, Balasubramanian, & Narayanan, 2005; WHO, 2003). It is therefore important to explore the community's understanding of TB, attitudes and behaviors towards the disease, as this may help explain how TB stigma is constructed as well as the way it operates within the community setting to affect the ability of patients to seek help and comply with treatment. This article reports on the attitudes and behaviors of community members towards TB in an urban district in Ghana. It was part of a larger study designed to explore and understand barriers to control of TB in Ghana (Dodor et al, 2010), and to elucidate how it operates in the community and healthcare system settings, affecting to prescribed treatment regimens. Such an understanding would aid in the development of strategies and interventions to counteract the effects of stigma on TB patients.

The breakthrough was as a result of public education, on the national TB day's. The achievements could also be attributed to intensive advocacy and sensitization on radio savanna and Filla Fm by Dr Iddrisu and his team. Education was continuously done in both English and Dagbani (the local language). Questions were answered from all corners of the metropolis that the transmission could reach. Detailed explanations were patiently given, when necessary.

**Conclusion:**

The incidence of pulmonary tuberculosis in Northern Ghana, as found in this study at Tamale Teaching Hospital (TTH) 2004 – 2012, is 83.3 per every 100,000.

There is an indication of remarkable improvement in the case detection efforts in the hospital which could possibly have resulted in the steady decline of positivity rates. Such gains made can further be

enhanced by creating effective help-seeking environments within the communities and the hospital, improving diagnostic and health systems efficiency. Furthermore, to minimize delay in initiating effective chemotherapy, intensified case-



finding activities should be directed towards high-risk communities and age-specific groups so as to increase awareness of typical symptoms of TB disease. the recommendations, if adopted shall help to control TB in rural areas of south Saharan Africa.

**Recommendation:**

- Advocacy
- Sensitization
- Education
- Training of staff
- Support of the program

Summarily; the constant failure of DOTS in the control and stopping of TB in Ghana has its solution in the myth around the disease TB. Until the

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demystification of the social understanding of the disease TB is well done, it will be difficult to stop TB.

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