

# Rapid assessment of a National Tuberculosis (TB) Control Programme in Eastern Ghana

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## SUMMARY

**Rapid assessment of a National Tuberculosis Control Programme (NTP) that provides free treatment for TB patients was conducted at Koforidua in eastern Ghana. In 1997, 540 people were clinically suspected with TB and 148 tested positive by laboratory diagnosis. Likewise in the first quarter of 1998, 223 people were suspected and 25 tested positive. Thus, coverage rate increased from 45 in 1997 to 74.5 in 1998. TB incidence was highest (29.7%) in age group 31 - 40 years and lower (2.2%) in children below 10 years. More males (64%) had TB than females. In 1996, 196 pulmonary TB patients were receiving treatment at Koforidua Central Hospital (KCH). Outcome assessments revealed 40.6% were cured, 5.6% had treatment failure, 6.7% were transferred out, 1.1% died, but most 46.1% defaulted. Defaulters were mostly men (46.3%) and those residing in Koforidua suburbs (47.2%) but this was statistically insignificant. The treatment regimen was effective since most cases were new (70%) with few relapses and treatment failures, 1.2% each. Knowledge of the reason for defaulting is important for the success of the NTP programme.**

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## Introduction

Tuberculosis, an air-borne disease resulting from infection with mycobacterium is a public health problem in developing countries. About a third of the world's population has already been infected with Mycobacteria but only nearly 8 million develop the disease annually [1]. In Sub Sahara Africa where the human immunodeficiency virus (HIV) pandemic has spread rapidly, rates of tuberculosis has overwhelmed control programmes [2]. Ghana with a population of about 17 million (1996 census), about 30,000 TB cases are expected every year. In a district of about 100,000 people, a total of 200 new cases are expected out of whom 100 are infectious. However, in 1996 only about a third (10,499 TB cases) was reported in the country. The most common bacteria types in West Africa are *M. tuberculosis* and *M. africanum*. A TB carrier is a danger to the community as they come into regular contact with other people in the market, buses, classrooms, offices, nightclubs and jails. TB is an important agent of morbidity and

mortality in a developing country like Ghana, which means added cost to an already staggering budget deficit and will seriously retard productivity and national development [3].

In Ghana, epidemiological data on the disease is incomplete but indications are that the incidence is high and rising alarmingly. It is estimated that half the adult population in Ghana are infected although the majority do not have the clinical disease. The use of TB control strategies like chemoprophylaxis, ventilation systems, ultraviolet lights, and active screening do not affect the source of epidemics and infectious person nor cause significant reduction in numbers of those affected or die from tuberculosis. A WHO control strategy named DOTS that uses a short course chemotherapy administered under direct observation provides the most effective strategy for TB patients [4, 5, 6]. To reduce TB transmission to a level where it is no longer a public health problem, a National TB Control Programme (NTP) was launched in Ghana in 1994. The NTP program identifies TB cases using sputum-smear microscopy and provides free medical treatment using DOTS

therapy. This study documented a rapid assessment of the NTP intervention on people from the eastern region of Ghana.

## Materials and Methods

Koforidua is the capital of eastern Ghana, located about 150km north east of Accra. The inhabitants are peasant traders, mainly ethnic Ashantis. Koforidua Central Hospital (KCH) is well equipped and has the infrastructure to handle and administer treatment under the NTP to TB patients.

Patients reporting to KCH with cough related ailments were selected for the study. Oral informed consent to participate was obtained from adults and patients of children less than 15 years. Patients information including characteristics such as age, sex, duration of cough and residence were recorded on an enrolled form T015 provided by the programme. Thereafter clinical examination was conducted and suspected patients were referred for laboratory examination.

### Laboratory procedures

Patients were educated on how to produce sputum by clearing the back of the throat and cough but not spit. Three sputum samples were provided by patients in plastic containers with specimen identification numbers. Slides were prepared from each sputum, fixed and stained with Ziel-Neelsen solution, decolorized with 25% H<sub>2</sub>SO<sub>4</sub> and counter-stained with 0.3% methylene blue. Degree of Mycobacterium infection was assessed by counting the number of bacilli at magnification 750x. The acid fast bacilli (AFB) numbers was scored as negative (no AFB per 100 in oil immersion fields, AFB/100 of), scanty (1-9 AFB/100 of) +1(10-99 AFB/100 field), +2(1-10 AFB/field), +3(>10 AFB/field). Precautions were taken to avoid contamination [7]. Patients on treatment also had their sputum examined on months 2,5,8 of treatment and month 3,4,5,8 when on re-treatment.

### Treatment

Patients diagnosed with TB were categorized

into groups for treatment. Treatments were combined antibiotics of Isoniazid + rifampicin combined (HR), pyrazinamide (Z), streptomycin (S), Isoniazid + thiacetazone combined (HT) and ethambutol (E). Those with smear positive cases and smear negative but very ill were treated with cultured HRZS (100, 150, 500 & vial 1mg) for 2 months, followed for 6 months with HT (300 & 150mg). Smear negative pulmonary TB cases had SHT 9150mg & vial 1gram) for 2 months and HT for 10 months. Relapse or treatment failures were given complex treatment of HRZES for 12 months. Children were given HRZ (100, 150 & 500 mg) for 2 months and HR (100 & 150mg) for 6 months [8].

### Outcome measures

Assessment outcomes of patients either being successfully treated or not were grouped into cured, treatment failure, defaulted, transferred out or died and properly documented on NTP client cards provided by the programme. Cured were TB patients who had smear negative results for 2 or more months or after 5 months of treatment. Failures were those with smear positive 5 months or more after treatment. Defaulters stopped treatment at a time. Relapse were those who were cured but again developed sputum smear positive, and those sent to another hospital to continue treatment were termed Transferred out.

## Results

### TB cases.

Patients, who reported with cough at KCH from January, 1997 to March, 1998 were examined clinically and at the laboratory. Tuberculosis was clinically suspected from people having cough for 3 weeks or more and the disease diagnosed when at least one of the three sputum samples was positive for *Mycobacterium tuberculosis*. In 1997, 540 people were clinically suspected for TB and 148 were positive by laboratory diagnosis. In 1998, January to March, 223 people were clinically suspected and 25 tested positive.

Attempts were made to determine the impact of health education intervention, calculated as coverage rate, in people of Koforidua and its environs. The coverage rate was higher in 1998 than in 1997; 74.3 (223/3 months) in 1998 and 45 (540/12 months) in 1997.

The number of TB cases was higher in the wet season, May to September, with a peak of 29 cases in July. January was exceptionally high with 23 cases.

#### *TB cases by age and sex*

The incidence of TB cases in different age groups and sexes are presented in Table 2. A high incidence was observed in age groups 21-40 years with the highest peak of 29.7% in the group 31-40 years. Low TB incidence of 2.2% was seen in children below 10 years and 9.9% in teenagers between 11-20 years. The TB cases reduced drastically in adults above 60 years; total of 9.9% in age groups 61-100 years. More TB cases were found in males (64%) than females but this was not statistically significant (Table 1).

**Table 1: Age and Sex of TB Patients**

Age Group (Years)	No. of Males	No. of Females	Total (%)
0-10	2	0	2(2.22)
11-20	5	4	9(9.9)
21-30	12	12	24(26.4)
31-40	21	6	27(29.7)
41-50	6	4	10(10.9)
51-60	8	2	10(10.9)
61-70	3	4	7(7.7)
71-80	1	0	1(1.1)
81-90	0	0	0(0)
91-100	0	1	1(1.1)
<b>TOTAL</b>	<b>58</b>	<b>33</b>	<b>91(100)</b>

**Table 2: Treatment Outcome Assessment by Sex of TB Patients**

Outcome	Males (%)	Females (%)	Total (%)
Cured	23(42.6)	13(37.1)	36(40.4)
Defaulted	25(46.3)	16(45.7)	41(46.1)
Treatment failure	4(7.4)	1(2.9)	5(5.6)
Transferred out	2(1.8)	4(11.4)	6(6.7)
Died	0(0)	1(2.9)	1(1.1)
<b>TOTAL</b>	<b>54(100)</b>	<b>35(100)</b>	<b>89(100)</b>

*Treatment: Cured cases and defaulters*

During 1997, 196 pulmonary TB patients were receiving treatment from the chest clinic of the KCH. The number included TB patients who were diagnosed as positive at KCH and those transferred from other health facilities. The number of TB cases on treatment followed for this study was 89.

A total of 36 (40.4%) patients were cured, 33 after a short treatment course (SC) of 8 months and 3 more after a standard treatment course (ST) of 12 months (Table 2). Two months during treatment, 30 patients of the cured cases tested negative for Mycobacterium. Forty-one (46.1%) defaulters stopped treatment when their smears were negative. Most defaulters (34/89) stopped treatment less than 5 months and few (6/89) after 5 months. Five (5.6%) other patients who defaulted after 5 months or more of treatment had their sputum smears still positive and were termed treatment failures. Six patients were transferred out and an insignificant of 1.1% (1/89) died during treatment (Table 2).

*Categories and Residence of TB cases*

Eighty-six of the TB patients on treatment were categorized. Most (70.9%, n = 68) were new cases, new smear positive. Of these cases 26 were cured and 35 defaulted. Nine patients (10.5%) started re-treatment after defaulting but 2 had treatment failure. The number of relapses and treatment failure cases together was only 2.4%; one each for relapse and treatment failure (Table 3).

Residences of 51 TB patients were recorded. More than half (70.9%, n = 36) of the patients lived in suburbs of Koforidua metropolis (Table 4). TB patients residing in Koforidua has higher cure rate, 53.3%, than those in the suburbs, 38.9%. There was no treatment failure in Koforidua patients as compared to 8.35 failures in patients from the suburbs. The difference (0.9%) in defaulters from Koforidua patients (46.7%) and the suburbs (47.2%) was significant.

**Table 3: Various Categories of TB Cases and Treatment Outcomes**

Category	No. of TB	Cured	Defaulted	Treatment Failure	Transferred Out	Died
New smear +	68(79.1)	26	35	3	2	1
New smear -	7(8.1)	4	2	0	1	0
Relapse	1(1.2)	0	0	1	0	0
Treatment aft. Default	9(10.5)	5	1	2	1	0
Treatment failure	1(1.2)	0	0	0	1	0
<b>TOTAL</b>	<b>86(100)</b>	<b>35</b>	<b>38</b>	<b>6</b>	<b>5</b>	<b>1</b>

**Table 4: Residence of Patients and Treatment Outcomes**

Residence	Number	% in each resident group				
		Cured	Defaulted	Transferred	Tre. failure	Died
Koforidua	15	53.3	46.7	0	0	0
Suburbs	36	38.9	47.2	5.6	8.3	0

## Discussion

A National Tuberculosis Control Programme (NTP) that provides free treatment to TB patients was introduced in 1994 in Ghana to reduce the transmission of the disease to a level no longer a public health problem. This study documented the impact of the programme on people in the eastern region of Ghana, Koforidua and its suburbs. It revealed a higher incidence of TB cases during the months of May to September, 1997, which marks both the major and minor rainy seasons in Koforidua region. The weather was generally cold with minimum and maximum temperatures ranging between 17°C to 30°C respectively (metro report, 1997). During this period most people report to health centres with cold related ailments such as pneumonia and cough and after laboratory testing some of these turn to be TB cases. The unexpected high TB incidence during the rainy season is probably because the AFB detects only advance pulmonary TB [9].

People in age groups 21-30 and 30-40 years had the highest numbers of TB cases, 26.4% and 29.7% respectively. This is probably because people in this age group form the bulk of workers in Ghana and as such engage in TB infectious activities. Such activities include smoking, large alcohol intake which weakens immunity, spraying of cars and handling various chemicals. The incidence of TB amongst children and teenagers from 1 to 20 years are low: TB cases was 2.2% in age group 0-10 years and 9.9% in 11-20 years. This may suggest that over 60% of all Ghanaian children have been given Bacille Calmette Guerin (BCG), the vaccination against TB, as part of the Expanded Programme on Immunization (EPI) [10]. This vaccine protects them against TB infection as opposed to adults most of whom did not receive all the BCG vaccine [11]. In the past the EPI programme may not have been effective since visual media such as Television was unavailable and only few radio stations existed. Furthermore, children are difficult to diagnose for TB because of their inability to produce sputum for laboratory testing.

More men were found to be infected with TB than women (63.7% of all the TB cases). It appears mostly men engage in activities which

may lead to TB infection and more men engage in sexual activities with multiple partners who may be carriers. Reports from studies in the USA indicated that men aged 40 years had higher incidence of TB although no age is spared from the infection. A high percentage, 40.4%, of the TB patients receiving treatment at the KCH in 1997 and 1998 were cured. Most, 91% of the TB positive cases tested negative after the second month of treatment. This suggests that *Mycobacterium tuberculosis*, the bacterium responsible for TB disease, is not resilient to the treatment regimen. Thus *M. tuberculosis* is a non-resistance type. It may also be due to the early detection of the bacteria in most cases since new smear positive cases was 79.1%.

The level of the treatment failures, 5.6% and relapse cases were significantly low compared to the cured cases. This further confirms the effectiveness of the treatment regimen and also probably more people have become aware that TB is curable by chemotherapy or orthodox medicine. The free treatment provided by the NTP may have enhanced the attendance at health facilities. More people may also be aware of the importance of undergoing full course of treatment. Only 1.1% of the patients died during treatment and this might have been due to other complications. Two patients on treatment after defaulting had treatment failure. This could suggest that resistant form of *Mycobacterium* may appear if too much drug is used [8].

A high percentage, 46.2%, of the TB patients defaulted before completing the treatment regimen. This study was limited in finding reasons for defaultation. It could be that patients thought they were cured when the disease symptoms disappeared and their sputum smears were negative for the TB bacteria after few months of treatment. Lack of sufficient education on the importance of completing the full course of treatment could also be a factor. It was observed that 70.9% of the patients receiving treatment at KCH were residents outside the Koforidua township. Some of them probably could not afford the transportation cost due to poverty and hence defaulted. Furthermore, any patient whose sputum smears are positive after 5 months treatment is considered a treatment failure according to the National TB Control Programme [10] and as such must be put on

re-treatment. Such patients undergoing another course of treatment may default due to the inconvenience and the long duration of a double treatment regimen. In addition, a strong stigma attached to TB patients make them shy away from treatment because of fear of being recognized by friends and relatives. The chest clinic of the KCH is located along a major road in the town hence passersby's can recognize TB patients.

Understanding why people default and providing drugs with shorter regimens and requiring less supervision will help contain the global tuberculosis problem. The recent cloning of the genome *M. tuberculosis* may permit the identification of new drug targets that could provide shorter treatment [11,12].

### Conclusion

The findings confirm the presence of Tuberculosis in Koforidua and its suburbs. The treatment regimen, combination of antibiotics, was effective in this area, which suggests Mycobacterium resistant strains are not common. However, since the defaulting rate is high it is more likely a total control could not be achieved unless more studies are done to elicit reasons for defaulting. Such knowledge is essential in obtaining a more detailed understanding of health seeking behaviour, development and spread of bacteria resistance and clinical effects, to form a base of appropriate policies and guidelines for health education.

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