Cure rate of Tuberculosis patients using DOTS programme in Kumasi metropolis, Ghana.

K Obiri-Danso, L Acheampong, D Edoh

Citation

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Abstract

The WHO recognizing the growing importance of TB as a public health problem introduced a new framework for its effective control called the Directly Observe Treatment Short course (DOTS). The DOTS strategy is a patient-centered approach to providing support to tuberculosis patients by observing patients while they take their drugs, thus ensuring patients complete their treatment. A review of the DOTS programme in the Kumasi Metropolitan area for a period of five years (1999 – 2003) was undertaken using data available in the four major TB hospitals; Komfo Anokye Teaching Hospital, Manhyia Hospital, Suntreso Government Hospital and the Kumasi-South Hospital. The data from the various hospitals were categorized into the various treatment outcomes, and the number and percentages calculated. The total numbers of TB patients registered under DOTS in the four hospitals within the Kumasi Metropolis, over the period under review (1998 – 2003) were 4025. Out of this number, the successful rate was 57.99%, default rate - 25.73% and failure rate - 1.68%. Statistically there were no significant differences amongst the success rate, cure rate, completed rate, default rate and the failure rate amongst the different hospitals. However, there were statistically significant differences in the death rates recorded by the various hospitals.

INTRODUCTION

Tuberculosis (TB) is recognized by the World Health Organization (WHO) as the world's largest single infectious disease and the cause of death in spite of current diagnostic methods (especially in developing countries) as well as the widespread availability of highly effective treatment drugs (WHO, 2001). The burden of the tuberculosis disease is mostly felt in developing countries where the HIV/AIDS pandemic remains the single factor for the increase (Raviglione et al., 1995). It is also on the rise in several European nations and the United States of America, particularly among HIV/AIDS patients (WHO, 1996; Moore et al., 1997).

Of the more than 21 million people co-infected with TB and HIV worldwide, 70% are concentrated in Africa. A large number of these people will develop active TB if they do not receive treatment. Co-infection is now influencing gender distribution of TB in many African countries. As HIV prevalence among young African women rises, they are also increasingly bearing the burden of TB (www.allafrica.com/stories/200610110765.html). Assessment of ongoing TB control efforts has recognized that the persistence of TB has been due chiefly to the neglect of TB control by governments, poor management, poverty, population growth and the significant rise in TB cases in HIV endemic areas.

To help address this, a new framework for effective TB control was developed and a global strategy called the Directly Observed Treatment Short course (DOTS) was adopted in 1993 by the WHO (WHO, 1997). DOTS is an internationally recognized health care management system that is patient-centered and provides support by observing patients while they take their treatment, thus ensuring that they complete their treatment. It also helps identify patients who are in the infectious stage of the disease by monitoring sputum samples under the microscope, providing effective drug treatment and monitoring the patients' process towards a cure (WHO, 2004). The implementation of DOTS as a treatment strategy in Africa has shown a marked success in improving the patient adherence to the treatment and consequently increased the chance of patient cure.

Presently, DOTS is being used in over 127 countries worldwide. DOTS have been found to be effective among HIV-infected patients as well as among those who are HIV negative. Even among HIV-infected TB patients, DOTS cures patients and results in longer, healthier lives (WHO, 2004). Improper treatment and management of TB leads to

multi-drug resistance TB (MDRTB). This normally occurs when patients stop medication midway after feeling a bit better. Treatment of MDRTB is extremely expensive, toxic, arduous, and often unsuccessful. MDRTB is a tragedy for individual patients and a symptom of poor programme performance. It is to deal with MDRTB that DOTS was adopted so that patients will be directly observed at clinics as they take their drugs (Espinal et al., 2000; Tahaoglu et al., 2001; Sterling et al., 2003).

In Ghana, an estimated 10,000 deaths due to tuberculosis occur each year. In 2003, Ghana projected 40,000 new cases of tuberculosis in its population of 20 million people. Since 1995, the number of new TB cases reported has risen from 2,195 to 12,000 cases in 1999 and sixty percent of these cases are amongst young women and men of reproductive age (15-45yrs) who are also in the working age group. This accounts for 4-7% in cost of lost productivity (www.stoptb.org/conference/press/Africa/AfricaNews.Ghana.html). A recent survey of TB cases in Ghana revealed that the rate of infection was 66 per 100,000 in the general population (Ghana National TB Control Programme, 2000). In Ghana, despite the aims of the DOTS programme to cure 85% of all TB patients by 2005, it had only achieved 44% cure because of the problem of Multi-Drug Resistant TB (MDRTBB) (www.stoptb.org/conference/press/Africa/AfricaNews.Ghana.html). Successes and set backs have not been properly quantified in Ghana and many other developing countries. So a review of the DOTS would provide a first hand information on the situation as it stands.

This study reviews the DOTS programme in the Kumasi Metropolis over the last five years vis-à-vis the successes and set backs and to provide policy makers with a first hand information on the effectiveness of the strategy. This would enable government and stake holders to know exactly where the problem is with the DOTS programme and to fashion out strategies to help in its proper planning and implementation.

MATERIALS AND METHODS

STUDY AREA

The review study was carried out within the Kumasi Metropolitan area which is 150sq km in size and the second largest city in Ghana. It has a population of 1,233,011 with an annual growth rate of 2.6% (Ghana Statistical Service, 2002). Politically, it is divided into four sub-metropolitan areas namely; Manhyia, Asokwa, Bantama and Subin. But for Health Services delivery, Manhyia sub-metropolitan area is sub-divided into Manhyia North and Manhyia South (Ghana Health Report, 2002). The Hospitals in the Kumasi Metropolis from which data was collected for the review were: Komfo Anokye Teaching Hospital (Chest Clinic), Manhyia Hospital, Suntreso Hospital and Kumasi-South Hospital. These Hospitals were selected using the purposive sampling technique which was based on its location and number of patients they serve.

The Komfo Anokye Teaching Hospital (K.A.T.H) is located at Bantama, a suburb of Kumasi and serves the whole of the Metropolis as well as its immediate peri-urban communities. It also serves as a reference laboratory for the rest of the hospitals in the metropolis. The Kumasi-South Hospital (K.S.H) is situated at Chirapatre and serves the people of Asokwa, Ahensan, Atonsu, Esreso, Gyenyase and Kaase. The Manhyia Hospital is located at Ashanti Newtown near the Manhyia Palace and serves Manhyia, Krofrom, Ashanti Newtown, Aboabo and Asawasi communities. The Suntreso Government Hospital is located at North Suntreso and serves North and South Suntreso, Patasi Estate, Kwadaso, Adoato, Asuoyeboa, Breman and Suame.

ETHICAL CONSIDERATIONS

Official letters signed by the Head of the Department of Theoretical and Applied Biology were addressed to all TB Coordinators of the selected hospitals. The letters introduced the nature and scope of the research to the coordinators and to seek permission for the work to be carried out in the metropolis. The data collected was verified by the metropolitan TB coordinator who had to compare it with records available in his office. He offered suggestions and advice on the handling of the data.

LIMITATION OF DATA COLLECTED

In the late 1990s, patients were put on both the standard treatment regimen (which was for a year) and the short-course (which is eight months). Hence the data on the late 1990s included some standard treatment regimen (though few).

DATA COLLECTION

TB record keeping books containing the names of TB patients registered under the DOTS and who had smear positive pulmonary tuberculosis, dates they got registered and treatment outcomes after the period of treatment were obtained from the TB Coordinators of the various hospitals. The information was compiled and arranged according to the number of TB patients, those who had been Cured,

Defaulted, Died, Failed and Completed for each year in the period under review (1999 – 2003).

CALCULATION OF INDICATORS

From the organized data for the various hospitals, treatment outcomes were calculated for each hospital and then for the whole metropolis using the W.H.O. standards. Treatment outcomes were expressed as percentages or 'rates' (Veen et al., 1998).

The conversion of the treatment outcomes into rate (i.e. percentages) makes easy comparison between the outcomes of the various hospitals under review.

STATISTICAL ANALYSIS

The analysis of variance (ANOVA) test of significance was applied to verify if the differences between the means of the indicators among the hospitals in the Kumasi Metropolis could be explained by random error. The Null hypothesis was that no significant difference existed between the means and variances of the above named parameters. If all the TB patients were assumed to have been drawn from a population of mean μ and variance σ^2, then σ^2 can be estimated in two ways by the principle of ANOVA. These are by way of the variation within the samples and variation between the samples.

RESULTS

Evaluation of the DOTS programme at different hospitals in the Kumasi metropolis between 1999 and 2003

Results show that the number of TB patients registered and recruited onto the DOTS programme at the different hospitals in the Kumasi metropolis did not vary significantly and that the numbers registered and recruited between 1999 and 2003 were relatively stable for all the hospitals (Table 1). The Komfo Anokye Teaching Hospital (KATH), a referral hospital recorded the highest number of TB patients followed by the Manhyia Hospital (MH) (a TB laboratory diagnostic centre), the Kumasi-South Hospital (KSH) and the Suntreso Government Hospital (SH) which recorded the lowest number.

{image:1}

PATIENTS WHO GOT CURED UNDER THE DOTS PROGRAMME

Generally, the number of TB patients who got cured under the DOTS programme from 1999 to 2003 increased progressively for all the hospitals (Table 2). However, Manhyia Hospital recorded a decrease between 2001 and 2002. Cure rate was highest at the Kumasi South Hospital with Suntreso Hospital recording the lowest although there were no statistically ($p \leq 0.609$) significant differences between the two hospitals).

{image:2}

PATIENTS WHO COMPLETED THE DOTS PROGRAMME

Patients who completed the DOTS programme in the different hospitals in the Kumasi metropolis increased progressively over the years under review. KATH had the highest completion rate whereas Kumasi South recorded the least (Table 3) although there were no statistically ($p \leq 0.278$) significant differences between the different hospitals.

{image:3}

DOTS PROGRAMME SUCCESS RATE IN THE KUMASI METROPOLIS

All the hospitals except Suntreso recorded over 50% success. The Manhyia Hospital recorded the highest success rate followed by the Komfo Anokye Teaching Hospital but the Suntreso Government Hospital had the lowest (Table 4). These differences were however not statistically ($p \leq 0.572$) significant.

{image:4}

DOTS PATIENTS WHO DEFAULTED

There was a steady decline over the review years in the number of DOTS patients who defaulted at all the hospitals within the metropolis (Table 5). The Kumasi South Hospital had the highest default rate and the KATH the lowest (Table 5). There were no statistically ($p \leq 0.950$) significant differences in the default rate between the different hospitals.

{image:5}

DOTS PATIENTS WHO FAILED TREATMENT

The percentage of DOTS patients who failed to go through the course of treatment did not follow any defined trend. Except in 2002 where there was an increase, in general, there was a decrease in the failure rate for patients who visited the KATH. However, at the Manhyia hospital, there was a general decline in default rate up to 2001 and then an increase up to 2003. Although the Kumasi South hospital had the highest failure rate there was a general decrease in

the failure rate in all the hospitals for the years under review (Table 6). There were no statistically ($p \leq 0.209$) significant differences in the failure rates between the different hospitals and the years under review.

{image:6}

PATIENTS WHO DIED IN THE COURSE OF TREATMENT

Death of TB patients registered with the DOTS programme did not follow any defined trend in all the five hospitals although KATH recorded the highest death rate with Manhyia hospital recording the lowest (Table 7). Statistically, there were no significant differences ($p \leq 0.209$) in the death rate among the different hospitals.

{image:7}

Tables 8, 9 and 10 shows the general treatment trends of tuberculosis patients within the Kumasi metropolis based on the DOTS programme.

{image:8}

{image:9}

Metropolis for the period under review (1999 – 2003)

{image:10}

DISCUSSION

The study shows that all patients (100%) who reported to the selected hospitals and were diagnosed of Tuberculosis were recruited onto the DOTS programme, an acknowledgement and acceptance of the DOTS programme by hospitals within the Kumasi Metropolis.

The Komfo Anokye Teaching Hospital recorded the highest (2598) number of T.B. patients which may be because it serves as a reference laboratory for all hospitals in the Kumasi Metropolis and also because it serves as a referral hospital for the whole of the Ashanti and Brong Ahafo Regions and also for the northern regions of Ghana.

Manhyia Hospital recorded the second highest (928) TB patients which is about three times the numbers at the Kumasi South and Suntreso hospitals. This may be attributed to the location of the hospital which is within the "Zongo" communities where the housing/settlement pattern is nucleated. Secondly, poverty levels in these communities is high which leads to poor health status as people live in conditions that perpetuate illness- including the situation where people are not able to afford cost of health care and therefore decline the use of health services (WHO/AFRO, 2000). Thirdly, the population density is high as a result of the practice of polygamy amongst the Muslim community. The number of persons per room in the various houses is high thus contributing to the spread of diseases. Additionally, sanitation conditions in these suburbs are deplorable (www.1911encyclopedia.org/Tuberculosis). Most of the inhabitants are within the low income bracket and their educational level is low as most of them are Herdsmen with house wives. A study by Shaw and Ainsworth (1998) reported that low income and low educational levels amongst communities usually result in the high incidence of illness and deaths as well as conditions associated with ill health.

The Suntreso and Kumasi South hospitals recorded comparable number of patients, 290 and 309 patients, respectively. These numbers represent about one seventh (1/7) the number recorded at the KATH. The fewer number of patients recorded at the Suntreso hospital may be due to the closeness of the hospital to KATH which is often preferred to the Suntreso hospital. Besides, the Suntreso hospital is located within a middle income community.

The Kumasi metropolis had a total of 4025 TB patients for the period under review. Comparing the population of the Kumasi Metropolis as at 2002, which was 1,233,011 (Population and Housing Census, 2000), the TB patients formed 0.33 percent of the population. This may seem insignificant but the nature and transmission of TB is such that if these percentages of patients are not well treated, then the disease can easily spread and increase the percentage astronomically. It is also envisaged that the percentage may be even higher since many patients do not report to the hospitals for treatment but resort to traditional medicines. Besides many residents in the metropolis are traders who cannot afford the luxury of attending to their health in the hospital compared to selling their wares on the market.

The study from the hospitals also indicates that the number of patients who were classified as 'cured' exceeded those who were classified as having 'completed', indicating that patients with infectious T.B. are always greater than those who cannot infect people with the disease (Tables 2 and 3).

Of all the hospitals used in the review, Manhyia Hospital recorded the highest (64.13%) success rate as against a default rate of 25.72%. Comparatively, it has the highest treatment programme among the hospitals used for the

review, even though the success rate did not meet the global target of 85% (www.emro .who int/STB/Tb day 04-RD message.htm). This high success rate may be due to the fact that the treatment is free. Also, most of the settlements are very close to the hospital, hence no transportation cost. The hospital also organizes educational programmes for the communities around the hospital which may by yielding results.

The Komfo Anokye Teaching Hospital had the next high (56.97%) success rate which is relatively low compared to the number of TB patients recorded for the hospital. Also, the 'default rate' at the hospital was 23.98%. KATH is a referral hospital for patients in the Ashanti and Brong Ahafo regions and therefore caters for many patients who do not necessarily reside in the neighbourhood of the hospital. Cost of transportation to the hospital to assess the DOTS programme may therefore be a limiting factor. Also, about 4.85% of the patients were 'transferred out' to other hospitals because of proximity. From hospital records, it was also observed that some of the patients had come from neighbouring regions who were later referred back to their regions for further treatment.

Kumasi South hospital had a success rate of 55.02%, third highest, but it had the highest default rate of 31.72%. The high default rate may be due to the location of the Kumasi South hospital, which is situated within the industrial hub of the metropolis. Most patients default or are unable to complete the DOTS programme because some patients may be transferred or laid off from work. Lean season farming also leaves most of the farmers with little money for transportation to the hospitals.

The Suntreso hospital had the lowest (45.51%) success rate and a default rate of 26.55%. The low success rate may be due to the high (13.70%) number of patients "transferred out" to other hospitals (most probably to KATH). Also, patients from nearby village communities like Sepaase, Abuakwa and Tanoso, who had to come to the hospital by car defaulted for lack of money.

In the Kumasi metropolis the success rate was 57.99% and the default rate of 25.73%. The success rate is evidently far from the global target of 85% (www.emro .whoint/STB/Tb day 04-RD message.htm). Similarly, the default rate is unacceptably high and this may be due to many patients discontinuing treatment after feeling a bit better. It may also be due to inadequate education given to the families of the patients about the dangers of defaulting, so that the families would help ensure that patients on DOTS programme complete the programme. This is because defaulting is a very dangerous phenomenon as it participates in patients' developing resistance to the existing drugs, which act as a source of infection. It is therefore important to prevent the onset of multi-drug resistant by ensuring appropriate care for TB patients through DOTS activities. It is also important that regular information on the dangers of drug resistance be highlighted to the patients and their families (Table 9) (www.emro .who int/STB/Tb day 04-RD message.htm). Statistically there were no significant differences among the success and default rates calculated for the various hospitals for the period under review.

The Kumasi South Hospital recorded the highest failure rate of 3.23% which is unacceptably high compared to the other hospitals. This may be because some of the patients who had earlier defaulted do re-registration at a later date as new patients. This may also explain the high default rate of the hospital.

The Suntreso hospital followed with a failure rate of 2.07%, and it was also the second highest in default rate. This may buttress the earlier suggestion that the defaulters may be the ones who later re-register for the DOTS programme and because of their haven developed resistance, fail the treatment.

The Komfo Anokye Teaching Hospital (KATH) had a failure rate of 1.58%, which was the third highest. Again KATH was the third highest in default rate. Hence it can be deduced that default rate has a direct relation on the failure rate (Table 9). In Brazil, a review of the DOTS programme reported similar findings, i.e. a default rate of 51% as against a failure rate of 42% (www.worldlungfoundation.org/map_brazil.html). Manhyia hospital had the lowest failure rate of 1.40 which corresponds with its lowest default rate (Table 9).

The failure rate for the whole of the Kumasi metropolis was 1.69%. This may seem to be low but it is still very high. This is because 1.68% of the patients under treatment had developed the multidrug-resistant TB (MDRTB). It is to avoid this that the DOTS programme gives free drugs in order to achieve a 0% failure rate.

Treatment of MDRTB is extremely expensive, toxic, arduous and often unsuccessful. MDRTB is a tragedy for individual patients and a symptom of poor programme performance (www.emro who int/sth/egypt/Research-

Chapter11htm.)

The cure and completion rates were used in computing the success rate. The highest success rate at the Manhyia hospital is due to it having the second highest completion rate of 22.83% and the highest cure rate of 41.30%. It must be noted that a high cure rate does not necessary lead to a high success rate. A high cure rate with a very low completion rate will lead to a low success rate. This was the case with the Komfo Anokye Teaching Hospital which had the highest completion rate of 24.36% amongst the hospitals but a low cure rate of 32.60% (last but one). Hence it had a success rate that was far lower than that of Manhyia hospital.

The Kumasi South hospital had a very high cure rate of 41.10% and a very low completion rate of 13.92% but had a low success rate of 55.02%. A low cure and completion rates lead to a low success rate. This was the case with the Suntreso hospital as it had the lowest cure rate of 30.69% and a low completion rate of 14.83% leading to it having the lowest success rate of 45.51% among the hospitals. There were no significant differences among the cure and completion rates calculated for the various hospitals for the period under review.

CONCLUSION

The total numbers of TB patients registered under the DOTS programme for the period under review (1999 – 2003) were 4025 which was the same as the total number of TB patients registered in the metropolis. In other words, all TB patients were put on the DOTS programme. The success rate for the Kumasi Metropolis was 57.99% which is less than the accepted global target of 85%.

The default rate for the Kumasi Metropolis for the period under review was 24.75% which is highly unacceptable because it may lead to multi drug resistant TB later.

The failure rate was 1.69% which though seem small, is still high since it gives an indication of the presence of multi-drug resistant TB among the DOTS registered patients over the period under review.

The DOTS programme in the Kumasi metropolis cannot be said to have been that successful compared to the global standards. The main set backs have been the high default rate amongst the registered DOTS patients.

RECOMMENDATIONS

In order to reduce the default rate, the DOTS programme should be reviewed at regular intervals, and supervision and monitoring plan strengthened.

To ensure proper monitoring more personnel must be recruited and trained to do house to house monitoring of patients already on the DOTS programme. The community health workers, volunteers as well as non-governmental health providers could be recruited to monitor the DOTS programme. This will prevent patients from giving excuses of not having money to go to the hospitals to take their drugs. The house to house monitoring would be made effective if a detailed history/data on each patient is recorded and made available to the monitoring personnel.

To enable TB patients to adhere to treatment they need support and care that is sensitive to their needs. That is providing a treatment partner or supporter acceptable to patients to reinforce their natural motivation to continue treatment and counter the normal tendency of some to interrupt treatment.

The national government should increase its commitment to the eradication of the TB disease the by mobilization of additional resources to complement that of the global fund. The DOTS programme should be made an integral health system activity with nation wide coverage.

DOTS patients with infectious TB must be admitted at a specially built facility to prevent the spread of the disease.

The TB control programme should be linked closely with HIV/AIDS prevention and control programmes, since HIV infections remains the single most important factor that increases the risk of developing TB.

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Author Information

K. Obiri-Danso
Department of Theoretical and Applied Biology, Kwame Nkrumah University of Science & Technology

L.O. Acheampong
Department of Theoretical and Applied Biology, Kwame Nkrumah University of Science & Technology

D.A. Edoh
Department of Zoology, University of Ghana