

**OUTCOME OF TUBERCULOSIS TREATMENT
IN SPUTUM POSITIVE PATIENTS AFTER EIGHT MONTHS OF
ANTI-TUBERCULOSIS THERAPY**

M.P.H THESIS
MUP 2000

BY:

SEMU CYRIL MUPAKILE

B.Sc(Hb)(UNZA, LUSAKA)

MB,ChB(UNZA, LUSAKA)

**A DISSERTATION FOR SUBMISSION TO THE DIRECTORATE OF THE
RESEARCH AND GRADUATE STUDIES, IN PARTIAL FULFILMENT OF
MASTERS DEGREE IN PUBLIC HEALTH**

THE UNIVERSITY OF ZAMBIA

LUSAKA

258735

JUNE 2000

TABLE OF CONTENTS

	<u>PAGE</u>
Table of contents	(i)
List of Tables	(iii)
List of figures	(iv)
Abbreviations	(v)
Declaration	(vi)
Statement	(vii)
Dedication	(viii)
Approval	(ix)
Acknowledgement.....	(x)
Summary	(xi)
1.0 INTRODUCTION.....	1
1.1 Background Information.....	1
1.2 Statement of the problem.....	5
1.3 Literature Review.....	8
2.0 OBJECTIVES	13
2.1 General Objectives.....	13
2.2 Specific Objectives.....	13
2.3 Hypothesis.....	13
3.0 METHODOLOGY.....	14
3.1 Study Design.....	14
3.2 Study Setting.....	14
3.3 Sample Size.....	14

3.4	Selection Criteria	15
3.5	Rejection Criteria.....	15
3.6	Sampling	15
3.7	Data Collection	15
3.8	Data Analysis.....	16
3.9	Ethical Consideration.....	16
4.0	LIMITATION OF STUDY	16
5.0	DATA ANALYSIS AND PRESENTATION.....	18
6.0	DISCUSSION	25
7.0	OUTCOME OF STUDY.....	32
8.0	CONCLUSION.....	35
9.0	RECOMMENDATIONS.....	37
10.	ANNEXES.....	38
Annex -1	References.....	38
Annex - 2	Questionnaire	42
Annex - 3	Letter of permission.....	44

LIST OF TABLES

		<u>PAGE</u>
Table 1	Age Distribution of Sputum Positive Patients	18
Table 2	Sex Distribution of Sputum Positive Patients	18
Table 3	Residential Distribution of Sputum Positive Patients	21
Table 4	Anti-Tuberculosis drug combination at the start of treatment in Sputum Positive Patients	21
Table 5	Continuation drug therapy after two months of initial therapy	22
Table 6	Reasons for not completing eight months of ATT	22
Table 7	Relationship of residential area and completing Treatment	23
Table 8	Relationship of age distribution and not completing Treatment	23
Table 9	Continuation drug combination in patients who tested sputum positive after the intensive phase of two months	24

LIST OF FIGURES

	<u>PAGE</u>
Figure 1 Pie Chart of Sex Distribution in sputum positive patients	18
Figure 2 Weight (kg) distribution of sputum positive patients	19
Figure 3 Sputum results after two months of initial treatment with ATT.	19
4. Figure 4 Patients who completed eight months of ATT	20
5. Figure 5 Age distribution of patients who died while on ATT	20

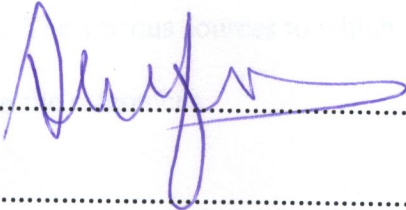
LIST OF ABBREVIATION

TB	-	Tuberculosis
INH	-	Isoniazid
MOH	-	Ministry of Health
AIDS	-	Acquired Immune Deficiency Syndrome
HIV	-	Human Immunodeficiency Virus
UTH	-	University Teaching Hospital
AAFB	-	Alcohol Acid Fast Bacilli
ATT	-	Anti Tuberculosis Therapy
UNZA	-	University of Zambia
ZMJ	-	Zambia Medical Journal
WHO	-	World Health Organisation

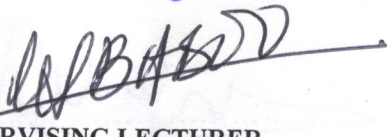
DECLARATION

I hereby declare that the work presented in this study for the degree of Master of Public Health has not been presented for any other degree.

SIGNED



APPROVED BY



SUPERVISING LECTURER
Prof. K. S. Baboo
(MBBS, M.med., FRSH)
M.P.H. Co-ordinator
Department of Community Medicine
UNZA.

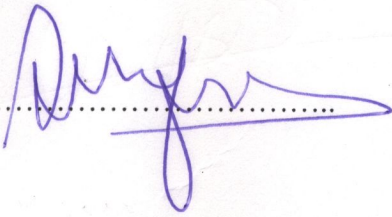
DEDICATION

STATEMENT

Dedicated to my wife, Virginia, and my two sons, Samu Cyril (Jr) and Samu
B. (Jr).

I hereby certify that this study is entirely the result of my own independent investigation. The various sources to which I am indebted are clearly indicated in the text and in the references.

SIGNED:.....

A handwritten signature in blue ink, appearing to be 'R. M. Jones', written over a dotted line.

DEDICATION

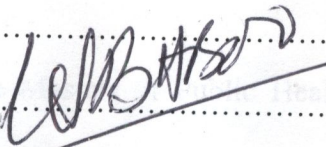
Dedicated to my wife, Vizenge, and my two sons, Semu Cyril (Jnr) and Sepu Baldwin Mupakile.

APPROVAL

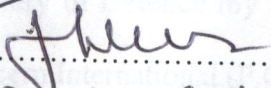
This dissertation of SEMU CYRIL MUPAKILE is approved in partial fulfilment for the requirements for the award of the degree in Master of Public Health by the University of Zambia.

Examiner's name and Signature

Date

.....

.....

.....
13/07/2000
.....

.....

Dr. L. CHILWECE
.....

.....
13/7/2000
.....

ACKNOWLEDGEMENTS

My sincere thanks and gratitude goes to my Project Supervisor, Prof. K. S. Baboo for his criticisms, advice, guidance and material support, without him, this research would not have been successful.

Special thanks to Dr. L. Chiwele, Head of Department of Community Medicine for his advice, and Mr. A. Mwale (H.I.S. Manager - UTH) for helping me analyse the data using the Epi Info on computer.

The Masters of Public Health degree (MPH) was supported financially by the Ministry of Defence my sponsors. I would like to pay special tribute to Project Concern International (P.C.I.) for financing this research.

Special thanks go to my two colleagues and classmates for their encouragement and assistance. I am also indebted to my family for their perseverance. Lastly but not the least, my thanks go to Kaweme Mwansa for her tireless effort in typing the study.

SUMMARY

The Study was conducted at the University Teaching Hospital (UTH) , chest clinic. The purpose of the study was to find out the outcome of tuberculosis treatment in Sputum Positive Patients after eight months anti-tuberculosis treatment.

Observation and literature review has shown that there has been an increase in the number of tuberculosis patients since 1980 . A large proportion of this increase has been attributed to the endogenous activation of dormant tuberculosis in HIV infected patients. Literature has also revealed an increase in the case fatality rate due to poor diagnosis of TB patients and this is despite TB being a curable and preventable disease.

The study is a retrospective audit of Tuberculosis files from January 1997 to December 1997. 256 files of adults who were diagnosed to be sputum positive were chosen by systematic sampling technique and data was analysed by computer using the EPI-INFO programme.

The findings of the study revealed that Tuberculosis affects more people between the ages of 20 and 45 years (84.7%), and males being in the majority (55.1%). 49.8% of the subjects files were not re-tested at the end of the two months intensive therapy.

58.7% did not complete their treatment, of these, 76.3% were defaulters. Almost 10% (9.5%) of these died while on anti-tuberculosis treatment. The majority of these came from high density areas compared to a low number 3.4% who lived in low density areas.

The study is clearly demonstrating the serious problem the tuberculosis control program is facing in Zambia. It appears the efforts put in are not enough. Therefore there is a probability of an explosive outbreak of dangerous type of tuberculosis involving all age groups and sexes and geolocations.

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Tuberculosis is an infectious disease caused by mycobacterium tuberculosis complex. This complex includes *M. tuberculosis* and *M. africanum* primarily from humans, and *M. bovis* primarily from cattle (Benson 1995).

Tuberculosis is a major cause of disability and death in many parts of the world. The initial infection usually goes unnoticed. Early lung lesions commonly heal, leaving no residual changes except occasional pulmonary or tracheobronchial lymph node calcifications. Approximately 90 – 95% of those initially infected enter this latent phase from which there is life-long risk of reactivation. In approximately 5% of apparent normal host and as many as 50% of persons with advanced human immuno deficiency virus (HIV) infection, the initial infection may progress directly to pulmonary tuberculosis or by lymphohaematogenous dissemination of bacilli, to pulmonary, military, meningeal or other extra pulmonary involvement. Serious outcome of the initial infection is more frequent in infant, adolescents, young adults and the immuno suppressed.

Progressive pulmonary tuberculosis arises from exogenous re-infection or endogenous reactivation of a latent focus remaining from the initial infection. If untreated, about half the patients will die within 5 years, a majority of these within 18 months. It is not worthy successful completion of chemotherapy, nearly always result in a cure, including in

person with HIV infection. Clinical status is based mainly on the presence or absence of tubercle bacilli in the sputum and also on the nature of change seen on chest radiographs. Abnormal x-ray densities indicative of pulmonary infiltration, cavitation and fibrosis can occur before clinical manifestations. Fatigue, fever, night sweats and weight loss may occur early, while localising symptoms of cough, chest pains, haemoptysis and hoarseness become prominent in advanced stages.

Tuberculosis is a chronic bacterial disease that still ranks high as a public health problem despite the fact that the causative organism was discovered more than a 100 years ago, and highly effective drugs and vaccine are available, making tuberculosis a preventable and curable disease. According to conservative world estimated, there are 15 – 20 million of infectious tuberculosis. The occurrence of 4 –5 million new cases and 3 million deaths each year maintains this “infectious pool”. (Park 1997)

Developed countries have achieved very good results in the control of tuberculosis. In the United States, from 1900 to 1980, tuberculosis death rates declined from 199 to 0.5 per 100,000. This decline started long before the advent of BCG or chemotherapy, and has been attributed to changes in the “non-specific” determinants of disease such as improvements in the standard of living and the quality of life of the people coupled with application of available technical knowledge and health resources.

Recent reports from the Ministry of Health (MoH) have stated since the AIDS epidemic in Zambia, the TB case rates have increased nearly 5 folds, i.e. 500 per 1,000 population

in 1996. The number of reported TB cases were more than 40,000. HIV and AIDS is one of the most important causes of re-emergency of TB in Southern Africa. Nearly two thirds of TB cases in Zambia are seropositive. Both published and unpublished studies conducted by Chintu, Baboo, Mwiinga and Zumla are suggesting TB to be a major killer for all age groups, specifically among those who are HIV related. In another study conducted by Baboo et al have shown children admitted with disseminated TB had 75% seropositivity, and 90% of these had B.C.G. scar marks. This raises a big question on the use of B.C.G. in those children who are seropositive for HIV infection. The study also shows low efficacy of A.T.T. drugs among these children.

The problem of tuberculosis is acute in the developing countries which account for more than three quarters of the cases in the world, and where the majority of the cases are never diagnosed at all, still less get correctly treated. There has been very little if any improvement in the epidemiological situation in many developing countries. There has been an overall increase in the absolute number of tuberculosis cases in these countries during the last three decades, especially due to an increase in the population during this period. In many developing countries, acquired drug resistance remains high, because national tuberculosis programmes in these countries have not been able to achieve a high cure rate over a very long period of time, even after the introduction of short course chemotherapy. Poverty, economic recession, and malnutrition make populations more vulnerable to tuberculosis. Recent increase in human migration has rapidly mixed infected with non infected communities.

Global tuberculosis notifications rates among the regions (i.e. per 100,000 population by World Health Organisation) between 1984 – 1986 and that of 1990 – 1993 period, there was an increase of 14.2% (Park 1997).

An average of 3.8 million cases of tuberculosis were reported in the period 1990 – 93. The magnitude of the problem is such that WHO declared it a global emergency in 1993. Recently in 1996, an estimated 7.4 million people developed tuberculosis bringing the global total sufferers to about 22 million of whom about 3 million will have died in the same space of time. This is due to global complacency, and the world has now realised that tuberculosis is not a disease of the past, therefore, if the effectiveness and availability of tuberculosis control measures do not improve substantially, more than 30 million tuberculosis deaths and nearly 90 million new cases are expected to occur in the last decade of this century.

The economically productive aged between 15 – 49 years, are the most affected by tuberculosis and 95% are in the developing world especially South East Asia, the Western pacific and Africa. The global situation has worsened by the lethal combination of tuberculosis with HIV. At the same time, drug resistance tuberculosis is a growing threat world-wide. Incomplete or inappropriate treatment of the disease has spawned the development of strains that are resistant to drugs that once destroyed the bacteria in 100% of cases. The cure rates of up to 95% fell to 56% or less and among AIDS patients infected with bacilli resistance to both drugs. On the basis of the criterion laid down by

the WHO, no single country in the world has succeeded in reaching the point of control, i.e. less than 1% tuberculin positive among children in the age group, 0 – 14 years.

1.2 STATEMENT OF THE PROBLEM

Zambia is a developing country in Sub-Saharan Africa and has not been spared from the increase in the number of tuberculosis cases. In 1980, there were 5,321 (93.35 per 100,000) notifications as compared to 37,000 (389.43 per 100,000) notifications in 1996. This was more than 200% increase in the number of tuberculosis cases. In 1988, there were 12,876 (176.38 per 100,000) cases of tuberculosis, out of which 4,297 (58.86 per 100,000) were sputum positive for acid fast bacillus (AFB). By the end of 1995, this figure (sputum positive cases) had more than doubled to 9,536 (103.65 per 100,000) cases, out of a total of 33,553 (364.71 per 100,000) notification in that year (MOH – 1997). Majority of these were HIV related and were not A.A.F.B. positive.

A large proportion of new cases are due to endogenous re-activations of dormant tuberculosis to an increase of the reservoir and related increase rate of transmission. The increased case fatality rate is due to the poor diagnosis of HIV/TB patients as a result of other complications of AIDS and adverse drug reactions, which are common in this group. The case fatality rate increased from 103.1 per 1,000 hospital admissions in 1981 to 226.7 per 1,000 hospital admissions in 1991, and then dropped slightly to 191 per 1,000 admissions in 1992. This drop may be attributed to the introduction of the home

based care programme of AIDS patient care which aims at caring for the patients in their homes. (MOH) – 1994).

The incidence rate of tuberculosis differs between provinces with the highest being in Lusaka province with an incidence rate of 2.4 per 1,00 population and lowest being Northern province with a rate of 0.7 per 1,000 in 1992 (MOH – 1994).

There has been a lot of research in Zambia done on tuberculosis regarding its treatment, adverse drug reactions and resistance, and recently its association with HIV. But little research has been done on the outcome of sputum positive cases in Zambia. Therefore this study aims to find out the outcome of sputum positive patients after completing eight months of anti-tuberculosis therapy (ATT), and their sputum status at two, five and eight months.

Zambia along with many other countries has recognised TB and its impact as a global emergency. In recent times the health authorities have been finding the basic problems in the control of TB which are as follows:

- Cost of drug
- Regular supply of ATT
- Failure to confirm diagnosis
- Successful administration of drugs
- And exact outcome of such a therapy

The above statements are made because of increased number of cases of resistance to A.T.T. and an increase in the number of defaulters. Many studies have attributed this to social problems and inability of the patient to acquire full cost of drugs throughout the period of treatment. This study has been undertaken to specifically investigate what was the total number of cases seen in the UTH, what was the successful diagnosis of TB., what kind of chemotherapy was available to them, how many of these successfully completed the course, and were rendered free from TB. Care was taken to see what was the morbidity and mortality pattern after the completion of ATT. In order to get this information, it was decided to go through the existing TB files in the Chest Clinic of the UTH. The study will also reflect on the reporting and recording system of all TB cases. Such a study was last done between 1982 to 1984. It is expected that the present study would form a base for a larger study in different geolocation of Zambia where TB appears to be a big problem.

The Ministry of Health in conjunction with the National Tuberculosis Programme have a standardised treatment regime for sputum positive, sputum negative, and relapse case in adults. The current treatment regime recommended for adults in Zambia (National AIDS/STD/TB and leprosy control programme) for sputum positive cases include four drugs - rifampicin, isoniazid, pyrazinamide and ethambutal in the initial two months (intensive phase). This is followed by two drugs - ethambutal and isoniazid in the next six months (continuation phase).

The information or results which will be produced by this study will help personnel involved in the treatment and control programmes of tuberculosis on the effectiveness of the interventions available at the moment and the expected rates of cure, treatment failures and sputum conversion rates.

1.3 LITERATURE REVIEW

Tuberculosis is a social disease with medical aspects. It has been described as a barometer of social welfare (Raghu 1980). The social factors include many non-medical factors such as poor quality of life, poor housing, and over crowding, population explosion, under nutrition, lack of education, large families, early marriages, lack of awareness of cause of illness etc, all these factors are interrelated and contribute to the occurrence and spread of tuberculosis.

The World Health Organization declared tuberculosis as a global emergency in 1993, and warned that the disease will claim over 30 million lives in the next 10 years unless immediate action is taken to curb its spread (Global Child Health, 1993).

Tuberculosis is number one cause of death as a single infectious disease, e.g. 300,000 children under 5 years die of the disease every year. WHO experts suggest that the resurgence of tuberculosis is due to:-

1. Public policy that neglect tuberculosis control programs to deteriorate or even disappear in many parts of the world during the last two decades
2. Tuberculosis and HIV link causing explosion to tuberculosis cases.
3. Demographic forces are at work. Children born in the last few decades in regions with high population growth rates are now reaching the ages where mortality from tuberculosis is high.
4. Poor implementation and management of tuberculosis control programs contribute to the emergence of drug resistant strains of tuberculosis bacteria.

Other causes, include the delay in isolation, identification and susceptibility testing of M. tuberculosis and poor drug compliance among the patients (Global Child Health, 1993).

A link of HIV and TB is one major factor in its spread and causes deep concern among WHO experts. In 1990, estimated 3.5 million people in Sub-Saharan Africa were dually infected with HIV and TB and consequently 25 fold increased risk of developing into fatal cases of TB.

Tuberculosis in North America and Europe has risen dramatically in the last 5 years. Italy reported a 28% rise during 1988 - 1990. Switzerland saw 33% rise from 1986 - 1990. U.S.A. reported a 12% increase during 1986 - 1991. By 1991, 27,000 new

Cases were reported.

However, the great majority of today's cases and more than 95% of TB deaths are in the developing world. It is established that in 1990, 300,000 children under five died of TB.

TB is curable and treatment is expensive, but successful treatment requires 6 - 8 months of consistent, uninterrupted medication. TB drug resistant or multi-drug resistant strain of TB bacteria are emerging in many parts of the world.

Drug resistant tubercle bacilli are transmitted in the same manner as drug susceptible organisms. The mechanisms by which "frontline" TB drugs - isoniazid, rifampin; pyrazinamide and ethambutal kill the tubercle bacillus have remained essentially a mystery since these compounds were discovered decades ago.

Countries with a high prevalence rate, annual risk of infection is 1% or more, 30 - 70% of the adult population is already infected with TB bacilli at some point in their lives (Tan 1995). Facilities which provide the treatment of TB must have a good mechanism to detect treatment defaulter, and take immediate remedial action to maintain a high standard of control of the disease and prevent the emergence of drug-resistant organisms.

A study in Japan involving 130 cases of pulmonary TB in foreigners, found defaulter rate was high at 40%. The reason for defaulting was broken down into:-

Discontinuation on his own 68%

Repatriation 15%

Side effects of drugs 19%

In this study, the average time of default was 3.2 months after the start of chemotherapy.

To reduce on the default and irregular drug taking once they feel better, another approach has been to shorten duration of treatment. In China, a project using DOTS and a highly motivated staff, reduced defaulter rate to 1.6% in their cohort of new smear positive TB cases (Stott, 1982).

DOTS has now been implemented in a number of countries with substantial improvements in rates of adherence and drug resistance.

Chemotherapy program results in Malawi, Mozambique and Tanzania had defaulter rates of 2.2% , 11.3% and 9.9% for DOTS respectively. For standard therapy, rate of absconding was 24.2% for Mozambique and 15.7% for Tanzania (Murray, 1996).

In Eastern Province in Zambia, as reported by the Zambia National AIDS/TB program, of the 463 patients enrolled on DOTS, 8% of cases died, 9% defaulted and 11% were transferred (Kamanga 1997).

In Zambia, there are 3 regime of TB treatment recommended by the Ministry of Health.

These are:-

Regimen A

Sputum positive TB/Dissiminated/Milliary TB

2 months intensive treatment : 2 RHEZ

6 months continuation treatment : 6 EH

Regimen B

Sputum negative TB/Extra-pulmonary TB

2 months intensive treatment : 2 RHZ

6 months continuation treatment : 6 EH

Regimen C

Sputum positive relapse/Treatment failures

3 months intensive treatment : 2 ERHZZ

1 ERHZ

5 months continuation treatment : 5 ERH

2.0 OBJECTIVES

2.1 General

To determine the outcome of Tuberculosis treatment in sputum positive patients after completing eight months of anti-tuberculosis therapy (ATT)

2.2 Specific

- (a) To establish the number of cases who became sputum negative after the initial two months of ATT (intensive phase)
- (b) To look at the number of cases who recovered completely after eight months of ATT
- (c) To find out the number of cases who died before completing eight months of ATT
- (d) To determine the number of cases who needed re-treatment after completing eight months of ATT

2.3 HYPOTHESIS

Null hypothesis - More than 60% of the Sputum positive patients complete eight months of anti-tuberculosis therapy.

Alternative hypothesis - Less than 60% of the sputum positive patients complete eight months of anti-tuberculosis therapy.

3.1 METHODOLOGY

3.0 CASE STUDY

A descriptive retrospective study was carried out on adult pulmonary tuberculosis patients who were sputum positive for alcohol acid fast bacillus.

3.1 Study Setting

The study was carried out at the TB/Chest clinic of the University Teaching Hospital (UTH), Lusaka.

3.3 Sample Size

It consisted of 256 files of adult patients who were sputum positive at the start of treatment. The sample size was calculated using the formula below:

$$N = \frac{t^2 Pq}{d^2} \qquad \text{nf} = \frac{n}{1+n}$$

$$= \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} \qquad = \frac{384.16}{1 + 384.16}$$

$$= 384.16 \qquad \qquad \qquad = 770$$

$$\qquad \qquad \qquad = 256$$

n=first estimate of sample size

t=1.96 (95% confidence level)

$p=0.5$ (Maximum variability assumed)

$q=0.5$

$d=0.05$ (5% accuracy)

N-size of target population

nf =final sample size

3.4 Selection Criteria

Only patients files which had confirmation of tuberculosis diagnosis i.e. sputum positive and were started on antituberculosis therapy were chosen.

3.5 Rejection Criteria

Any file which did not contain the above information was rejected.

3.6 Sampling

This was achieved by systematic sampling technique. ie only every fifth file which met all the selection criteria was chosen.

3.7 Data Collection

The relevant data was extracted in confidence from the patients files using a prepared questionnaire. Two Research Assistants were recruited from the Chest Clinic staff who are in-charge of records. Files analysed were between 1st January to 31st December 1997. A sample size of 256 was needed, which was calculated using the statistical formular shown in the methodology. The data collection started in March 1999, and lasted up to April 1999. A total of 4,501 files of patients who had attended the UTH Chest Clinic between January 1997 and December 1997 were analysed. From the

number (4,501), 1,280 were sputum positive and satisfied the selection criteria, while 3,221 were sputum negative and did not satisfy the selection criteria, and were therefore rejected. Then every fifty file which satisfied the selection criteria was chosen until the sample size of 256 was achieved.

3.8 Data analysis

The data from the patient evaluation questionnaires was stored on computer and analysed using the EPI-INFO programme and scientific calculator. Statistical analysis involved the calculation of chisquare, p-value and yates test to determine significance. A p-value of 0.05 or less was considered to be statistically significant.

3.9 Ethical Consideration

The research protocol and questionnaire was reviewed by the Research and Ethics Committee of the University of Zambia. Permission was also obtained from the Director of the University Teaching Hospital Board and the Officer in Charge of the chest Clinic at U.T.H. The information collected from the patients files were kept under strict confidence.

4.0 LIMITATION OF STUDY

Studies on outcome of Tuberculosis treatment in sputum positive patients after eight months of ATT are scarce in Zambia, thus offering little or none comparable data locally to this study. Most files had certain vital information required for the study missing , e.g. marital status , occupation, why the patient did not complete the treatment, and if the treatment was completed, whether the patient had fully recovered at the end of eight

months of ATT Therefore the occupation of the patient and marital status could not be analysed due to few files not containing such information. Thus the association of Tuberculosis, marital status and occupation could not be established in this study.

5.0 DATA ANALYSIS AND PRESENTATION

TABLE 1 AGE DISTRIBUTION OF SPUTUM POSITIVE PATIENTS

AGE (YRS)	FREQUENCY	PERCENTAGE
15-19	15	5.8
20-24	33	12.9
25-29	62	24.2
30-34	60	23.4
35-39	28	10.9
40-44	34	13.3
45-49	16	6.3
50-54	4	1.6
55-59	3	1.2
60-64	1	0.4
TOTAL	256	100
MEAN = 32 yrs MODE = 30 yrs	MIN = 15 yrs MAX = 60 yrs	

TABLE 2 SEX DISTRIBUTION IN SPUTUM POSITIVE PATIENTS

SEX	FREQUENCY	PERCENTAGE
MALE	140	55.1
FEMALE	114	44.9
TOTAL	254	100

Figure 1 - PIE CHART OF SEX DISTRIBUTION IN SPUTUM POSITIVE PATIENTS

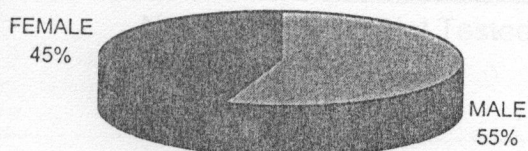


FIGURE 4 PATIENTS WHO COMPLETED EIGHT MONTHS OF

FIGURE 2 WEIGHT(Kg) DISTRIBUTION OF SPUTUM POSITIVE PATIENTS

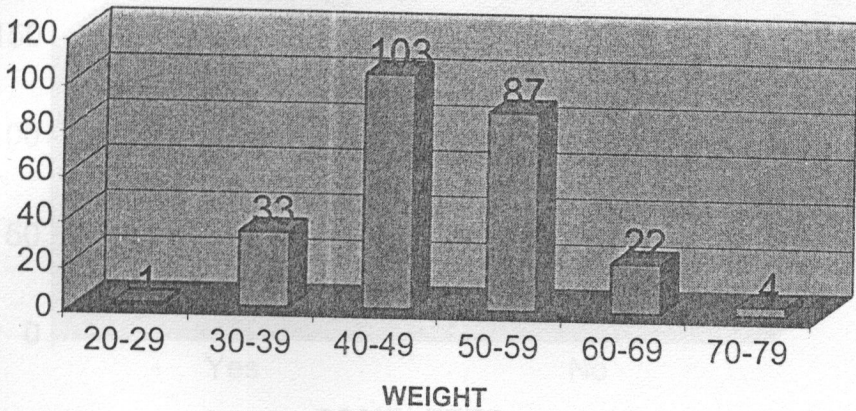


FIGURE 3 SPUTUM RESULT AFTER TWO MONTHS OF INITIAL TREATMENT WITH A.T.T.

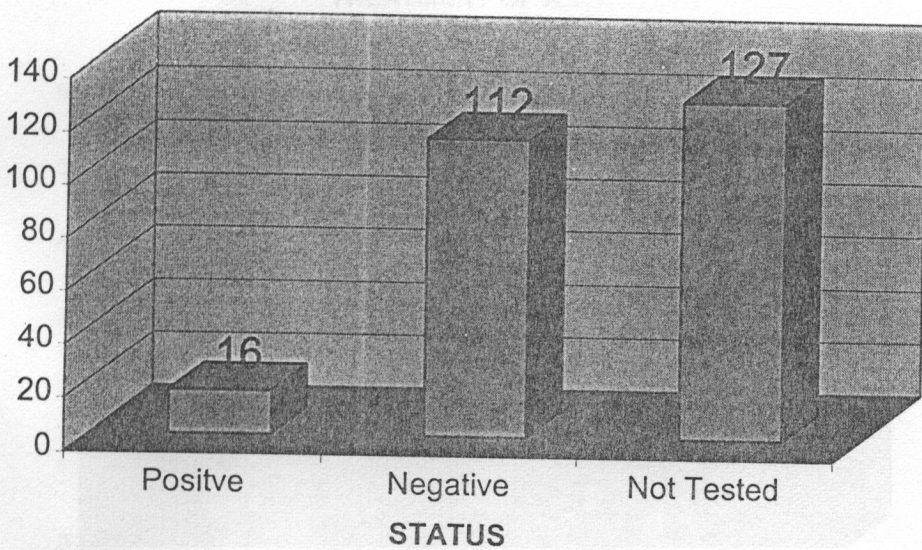


FIGURE 4 PATIENTS WHO COMPLETED EIGHT MONTHS OF A.T.T.

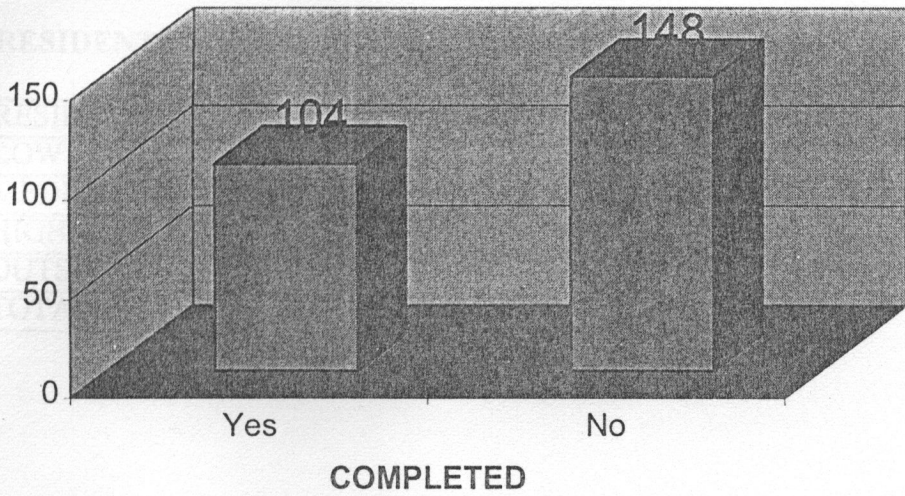


FIGURE 5 AGE DISTRIBUION OF PATIENTS WHO DIED WHILE ON TREATMENT OF A.T.T.

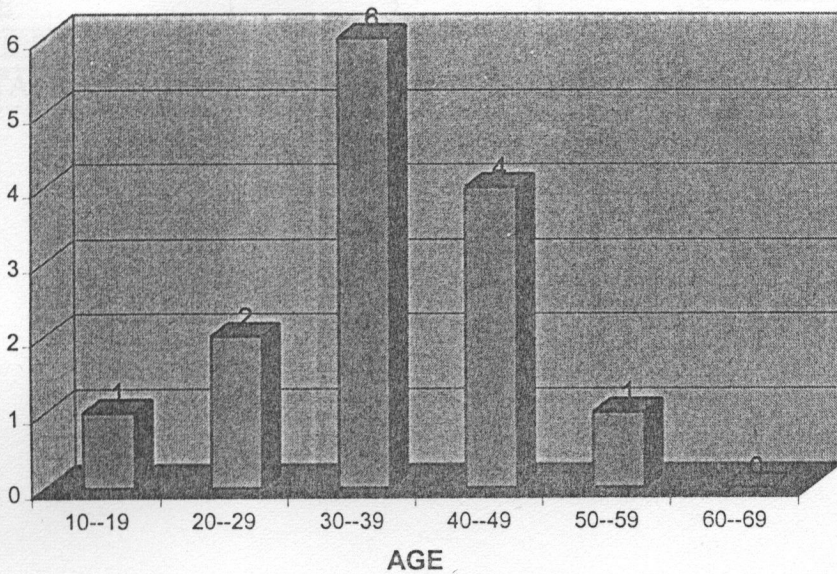


TABLE 3 RESIDENTIAL DISTRIBUTION OF SPUTUM POSITIVE PATIENTS

RESIDENCE	FREQUENCY	PERCENTAGE
LOW COST	175	68.4
MEDIUM COST	71	27.7
HIGH COST	7	2.7
OUTSIDE LUSAKA	3	1.2
TOTAL	256	100

TABLE 4 ANTI-TUBERCULOSIS DRUG COMBINATION AT THE START OF TREATMENT IN SPUTUM POSITIVE PATIENTS

DRUG COMBINATION	FREQUENCY	PERCENTAGE
R.I.P.E.	227	88.7
R.I.P.S.	5	2
R.I.P.	19	7.4
R.I.E.	3	1.2
OTHER	2	0.8
TOTAL	256	100

TABLE 5 CONTINUATION DRUG THERAPY AFTER 2 MONTHS OF INITIAL THERAPY

DRUG COMBINATION	FREQUENCY	PERCENTAGE
E.I	227	88.7
R.I	5	2
R.I.E.	10	3.9
R.I.P.E.	3	1.2
OTHER	11	4.3
TOTAL	256	100
R = RIFAMPICIN E = ETHAMBUTAL I = ISONIZID P = PYRAZINAMIDE		

TABLE 6 REASONS FOR NOT COMPLETING TREATMENT

REASON	FREQUENCY	PERCENTAGE
DEFAULTER	113	76.3
DIED	14	9.5
OTHER	21	14.2
TOTAL	148	100

TABLE 7 RELATIONSHIP OF RESIDENTIAL AREA AND COMPLETING TREATMENT

RESIDENTIAL AREA	COMPLETED TREATMENT		TOTAL	PERCENTAGE
	YES	NO		
LOW COST	67	106	173	71.6
MEDIUM COST	34	35	69	23.6
HIGH COST	2	5	7	3.4
OUT OF LUSAKA	1	2	3	1.4
TOTAL	104	148	247	100
CHI-SQUARE = 2.95				
DEGREE OF FREEDOM = 3				
P-VALUE = 0.40016				

TABLE 8 RELATIONSHIP OF AGE DISTRIBUTION AND NOT COMPLETING TREATMENT

AGE	FREQUENCY	PERCENTAGE
10-19	7	4.7
20-29	53	35.8
30-39	54	36.5
40-49	30	20.3
50-59	3	2
60-69	1	0.7
TOTAL	148	100
MEAN = 32.4		
MODE = 30		
P-VALUE = 0.00012		
MEDIAN = 30		

TABLE 9 CONTINUATION DRUG COMBINATION IN PATIENTS WHO TESTED SPUTUM POSITIVE AFTER THE INTENSIVE PHASE OF TWO MONTHS TREATMENT

DRUG COMBINATION	FREQUENCY	PERCENTAGE
E.I.	12	75
R.I.	0	0
R.I.E.	1	6.2
R.I.P.E.	3	18.8
TOTAL	16	100
R = RIFAMPICIN E = ETHAMBUTAL I = ISONIAZID P = PYRAZINAMIDE		

6.0 DISCUSSION

The study was conducted at the University Teaching Hospital (UTH) between January and December 1997. In order to collect the full profile of tuberculosis pertaining to this study, the chest clinic was found to be most suitable. Major activities of tuberculosis concerning diagnosis, treatment and follow up are carried out here. After adopting a strict screening procedure, 256 files were selected from a grand total of 4,501 for that year. The earliest age was found to be 15 years, oldest was found to be 60 years, giving a mean age of 32 years (Table 1). This shows that the younger age group were more vulnerable to TB than their older counterparts. The peak age of tuberculosis was seen between 25 and 34 years of age, were the major bulk of the cases came (122).

It is very well known that the increase of TB in recent times is due to HIV infection. This study did not look at the assertion of TB with HIV infection, but one cannot rule out the probability of its association to the large number of TB cases who are seen in the active reproductive age group (Table 1). If serotesting was done among the patients, at least one third of these would be seropositive according to the 1992 sentinel surveillance, and in such cases diagnosis and treatment becomes very difficulty. Perhaps this could be one of the reasons one could be seeing so many patients either are not coming forward to treatment or are fed up due to the disease's long duration, inconsistency, resistance and stigma.

Only patients with sputum positive where chosen in this research because sputum positive smear examination by direct microscopy is now considered the method of

choice. The reliability, cheapness and ease of direct microscope examination has made it number one-case finding method all over the world. It enables us to discover the epidemiologically most important cases of pulmonary tuberculosis, i.e. those excreting the tubercle bacilli in their sputum. This is the group which contributes most of the new cases to the 'pool of infection' every year (Park 1997).

Studies have shown that the examination of three consecutive specimens (e.g. of on the spot, overnight and the following day at the clinic sputum) detects a large number of infections cases in the community.

From the sex distribution (table 2), it can be seen that there is a predominance of males being affected with tuberculosis (55.1%) compared with the females (44.9%). This shows that more males are likely to fall sick with tuberculosis than the females (p-value 0.0116332-yates corrected). This is in line with other observations who have confirmed tuberculosis to be more prevalent in males than in females (Divan V.K et al 1998). A large proportion of males being more affected than females could be because males are outgoing and involved in working conditions which predisposes them to tuberculosis e.g. labourers on farms, mines, confinement in camps (Barracks etc).

It has been mentioned earlier that the majority of the cases seen in the study had an average age of 32 years and the average weight at this age should be between 59 and 60 kg (1982 Nutritional Handbook by Barley). Figure 2 clearly shows 48kg as the mean weight of all the studied subjects, this clearly shows the implication of low weight in TB

patients. Despite normal recording of weight, nobody really has assessed whether this loss of weight is due to TB, its complications or any other reason.

The weight distribution (Fig. 2) showed that most of the patients reviewed weighed below 50kg (54.8%) at the start of anti-tuberculosis treatment. The majority of the patients weighed between 40 and 59kg (76.0%). The mean weight was 48.4kg while the minimum and maximum weights were 24.0kg and 76.0kg respectively. Malnutrition is widely believed to predispose to tuberculosis, but the available evidence on this point is only indirect. Pioneering studies in India at Tuberculosis Chemotherapy centre, Madras, showed that the diet had no discernible influence on the recovery of patients in the context of potent chemotherapeutic drugs (Park 1997).

Residential distribution (table 3) was divided into three (3) classes, i.e. low cost (high density) area, medium cost (medium density) area and high cost (low density) area. It was observed that, the majority of the patients (68.4%) came from low cost areas. And the lowest number of patients being recorded from high cost areas (2.7%). This finding is similar to other findings which found tuberculosis infection in urban areas more frequently in slum dwellers and lower socio-economic groups than in well to do groups (Park 1997). This is because in high density areas, there is poor housing which is associated with overcrowding which increases the risk of massive infection and re-infection.

Most of the patients (88.7%) were started with the four drug combination recommended by the Ministry of Health (MOH) in sputum positive patients. These drugs are rifampicin, isoniazid, pyrazinamide and ethambutol for the first two months, called intensive phase (Table-4). The four drug regime in the intensive phase has been especially explored in large trials in Hong Kong among Chinese patients. (Lambert HP et al 1992).

Crofton et al in their articles, General Guidelines in the treatment of tuberculosis have specifically mentioned that no tuberculosis drugs be given to patients on suspicion. Sputum testing and confirmation is a must if one has to give anti-tuberculosis therapy. In the present study, most of the diagnosis are made on clinical evidence and sputum testing.

At the end of two months intensive therapy, 44.0% of patients were converted to sputum negative status (Fig. 3) while a minority of patients (6.2%) were still sputum positive. The majority of the patients were not checked (49.8%) for their sputum status after the intensive phase (two months) despite it being a requirement before the start of the continuation phase in patients who were diagnosed sputum positive at the start of chemotherapy.

It should be noted that nearly 50% (Figure-3) were not sputum tested after two months of intensive therapy, this is a gross anomaly in any controlled programme specifically tuberculosis. If all were tested for AAFB, sputum negative rate after treatment would double to 88%, at the same time those who did not respond to treatment would also had

the probability to double from 6.2 to 12.4%. This is a very dangerous situation at least for those who are positive cases who were not followed up, and these are the ones who could be spreading the infection to the community and immediate contacts. This is the major set back of non-adherence as has been observed at UTH. One wonders what could be the situation in the other clinics where the facilities may be worse than what is at UTH. The 6.2% of patients who were still sputum positive could be attributed to the growing menace of drug resistant tuberculosis, poor compliance, poor treatment and non-drug delivery to the patient. Poor compliance could be due to the patient failing to take the drug as instructed, particularly if they think it causes side effects, they may stop treatment or may default intermittently for short periods. Poor treatment could be due to inadequate dosing, inappropriate prescribing or failing to identify a history of previous treatment failure, and failure to promote good compliance and follow up. Non-drug delivery can arise in patients failing to obtain all the drug they need due to lack of financial resources, or due to frequent or prolonged shortages of anti-tuberculosis drugs. Resistance to anti-tuberculosis drugs may be either acquired (secondary) or initial (primary). Secondary resistance is the consequences of sub-optimal drug regimes which encourage the selective growth of drug resistant mutants.

The later is due to infection by bacillus that is already resistant to one or more drugs. Factors contributing in the development of drug resistance include intermittent drug supplies, inavailability of combination preparations, use of time expired drugs, inappropriate prescribing practices (notably the addition of a single drug to a failure

regimen in the absence of bacteriological control), in supervised therapy and irregular sale of drugs. All these are avoidable (Grange).

Table-5 showed that the majority of the patients (88.7%) were continued with a two drug regime in the continuation phase. This consisted of ethambutol and isoniazid. And most of the patients who were still sputum positive after the intensive phase were also given a two drug regimen of ethambutol and isoniazid in the continuation phase (75.0%). Only a minority number (18.5%) were continued with the recommended four drug regime consisting of rifampicin, isoniazid, pyrazinamid and ethambutol (table-13).

The results also showed that most of the patients (58.7%) did not complete eight months of anti-tuberculosis therapy (table-8) only 41.3% completed the treatment. Table-6 showed that the majority (76.3%) who did not complete treatment were defaulters, while 9.5% died while on anti-tuberculosis treatment.

Table-7 also showed that the majority of the patients (71.65%) who did not complete the ATT resided in the low cost (high density) areas while only 3.4% came from the high cost (Low density) areas. But this was not a statistically significant observation (P-value 0.40016).

Among the patients who did not complete the eight months of treatment had their ages ranging between 20 and 49 years (92.6%) while 72.3% of these had their ages ranging

between 20 and 39 years. This was a statistically very significant observation (P-value 0.00000).

The majority of the patients who died while on anti-tuberculosis treatment had their age ranging between 30 and 49 years (71.5%), thus taking away a young and economically productive age group.

7.0 OUTCOME OF THE STUDY

Even though Zambia is a male dominant society, it only relates to decision making relating to sexual relationship and use of funds. When it comes to sensitive issues like HIV infection and tuberculosis, majority of the Zambians are conservative especially men and women coming from younger age group. Men and women suffering from such situations when they come from younger age group have the tendency to either take the disease process or hide it. Under no circumstances they wouldn't like anybody to know this disease or its outcome. They try to acquire the quickest possible method to reduce the impact of the disease as fast as possible, as a result of which, they tend to access private resources rather than adopting to routine diagnostic process and appropriate treatment. Upon slightest improvement they prefer to resume normality in the family and community as if nothing had happened. This is the major contributing factor to discontinuation of treatment, development of resistance and finally defaulting. This fact is proved from the finding of the study (Table 8). 148 of these did not complete the treatment and fell between the age group of 20 - 49 years. 76% of these were defaulters (Table 6). Mortality among these were about 10%. If larger sample size was taken along with appropriate follow up, perhaps the finding would have been double to what is mentioned.

Zambia is a poverty stricken country, drought, economic depreciation and disease, has further contributed to the impact of poverty. This has got a pertinent relationship in the finding of the study, nearly 72% of the participants (Table 7), came from low social economical background, even though these had the desire to present themselves to the

nearest health centre at the first opportunity, did not do so because they didn't have the means to acquire the drugs for the successful completion of treatment.

In Zambia, there has been a big worry about the regular supply of ATT in hospital and health centres. According to the mandate of the health reforms, treatment to diseases like tuberculosis and HIV infection is supposed to be free. However, this dream of the recipient and the giver is yet to be fulfilled. A large percentage of people have been lobbying to the government concerning the acute shortage of anti-tuberculosis drugs in hospitals and health centres. If the hospitals are facing shortage, then it is obvious that an average TB patient, cannot buy it from the drug store, because 18 months of treatment will cost him 1.5 million kwacha which is beyond everybody's reach. This is the logistic which has been continuing and gaining momentum in the last ten years. It looks like social impact, high cost and poverty will simply take the toll for such a long time, that there will be nobody left for the disease to attack.

It has been stated that DOTS is the key to successful prevention for the control of TB (Kamanga 1997). The biggest question is, is it possible? Those countries who were claiming the gains of DOTS must be having regular supply of drugs, close monitoring and follow up of their patients, a good transport system, and an appropriate diagnostic tool. These even though exist in Zambia, are not enough to cater to the health needs of the people. As far as this study is concerned DOTS is practically non existent. It is partially practised when ATT is given in the first two months. After that patients take medication and come back for monthly review for a further 6 months. No body knows whether these really take their medication regularly for lack of supervision. This is only

possible if the subject is in a sanatorium or well-to-do family. This however is not the situation in Zambia. For those who claim success of DOTS may have revealed their experience of their individual studies or projects which are well funded. This is however not true for the rest of the country because such facilities or supervision for the implementation of DOTS is acute, beside the availability of ATT which is in short supply.

One of the striking observation of this study is that not one of the 4,501 files gave evidence of sero-testing for the HIV infection, yet it is claimed that 90% of tuberculosis increase is due to its association with HIV infection. This has been proved by studies conducted by Baboo 1999, Chintu and Mwinga. In the chest clinic the only laboratory test carried out are sputum testing, x-ray and mantoux test. Zambia has got many achievements in the field of HIV infection and tuberculosis which are internationally recognised, unfortunately people have not yet been sensitised for mandatory testing for HIV infection. Stigma appears to be a big setback in the prevention of tuberculosis and HIV infection.

8.0 CONCLUSION

It is an established fact that those who acquired the help of health services at its earliest complaint, and followed the diagnostic and treatment procedures are successful at getting rid of not only TB but any other diseases they want to get rid off. Successful administration of ATT, follow up of its effect and necessary adjustment is a must for TB control program. Findings of the study are thought provoking, those who are suffering from TB are acquiring it at a very early age, majority of them being male (average age 32 years). These also came from high density areas, reflecting on their low social economical background.

Those who are on intensive ATT, only 50% were re-tested for sputum, so what was the exact scenario after treatment was not completely known. Perhaps there was a shortage of reagents for testing sputum or lack of sensitivity to do so. The files did not reveal the HIV status of the participants on the study. It can only be assumed that two thirds ($\frac{2}{3}$) of those who suffered from TB could be seropositive according to 1997 Central Board of Health Statistics.

At the beginning of treatment, the study reveals all the subjects to be AAFB positive at the beginning of the study, since re-testing after therapy was not done, it will be very difficulty to postulate if the treatment schedule was successful in these patients.

In order to acquire the sample size of 256, one had to go through as many as 4,500 files, and select those who had positive evidence of TB. Clinically all the files gave evidence

for their diagnosis of pulmonary TB. Not all of these were sputum positive, this makes the diagnosis of TB very difficult. Perhaps one can assume that AAFB negativity could be attributed to its relationship with HIV infection. Studies have shown TB without its association with HIV had high rate of A.A.F.B. positivity and those who were related to HIV infection were not positive. Difficult procedures like taking sample from gastric secretion and sputum culture would become necessary in such situations. These however, is not done as a routine procedure at the University Teaching Hospital.

9.0 RECOMMENDATIONS

1. More emphasis is required in the sensitisation of tuberculosis patients on the dangers of not completing treatment.
2. The medical personnel's in - charge of treating patients with tuberculosis should be following strictly the treatment regimes recommended by the Ministry of Health in the treatment of sputum positive patients, that is an intensive phase of two months involving a four drug combination, and then a mandatory laboratory check on their sputum status, and depending upon the sputum status, continue with the relevant regime.
3. A deliberate policy should be made to follow up those who have defaulted for one week and encourage them to continue and finish their treatment.
4. For the DOTS programme to work, the Ministry of Health should make sure that the anti-tuberculosis drugs are available , accessible and affordable to the patients at all time. Because shortage of anti-tuberculosis drugs discourages patients to go to the health centres and also breeds resistance to the drugs.
5. Since most tuberculosis clinics are managed by paramedical personnel, they should be trained properly on each phase of treatment and to attend to different needs of individual patients.

10. ANNEXES

1. References

1. Autommcci G, Girardi E, Raviglione HC, Ippolito G. et al. Risk Factor for tuberculosis in HIV-infected persons. A perspective cohort study. JAMA 1995;274:143-8
2. Benenson A.S. Control of communicable diseases manual . 12^{ed}, Washington DC. American Public Health Association. 1995:413
3. Bless C, Kathuria R. Social Statistics. An African perspective, 1st ed. Cape Town: Juta 1998, 367
4. Chretien J, Tuberculosis and HIV. The course and diet : Bull Int. Union Tuberc living DIS 1990;65(1) : 25-8
5. Central Statistical office, Ministry of Health and Macro International Inc. Zambia Demographic and Health Survey 1996. Calverton Central Statistical Office and Macro international Inc . 1997.
6. Cook AJC, Juchilli LM, Buve A, Foster SP, Godfrey-Fancett, Pandey GS, McAdam KPWJ. Human and bovine tuberculosis in the Monze district of Zambia, a cross-section study. Br Vet J. 1995;152:37-46.
7. Crofton, J., Horne, N., Miller, F. Clinical Tuberculosis, 1st Edition, London, Macmillan, 1992, 210.
8. Datta, M., Radhamani, M.P., Salvaraj, R., Paramasivan, C.N., Gopalan, B.M., Suddra C. R., Prabhakar, R. Critical assessment of smear positive pulmonary tuberculosis patients after chemotherapy under the District Tuberculosis Control Program. Tubercle and lung disease, 1993.74 : 180 - 86.
9. Diwan Vik, Thorson A, Winkvist A. Gender and Tuberculosis. 1st ed. Goteborg. Nordic School of Public Health 1998:99
10. Dolin PJ Raviglione MC, Kochi A. Global tuberculosis incidence and mortality during 1990-2000. Bull world Health Org. 1994;72:213-20
11. Donald PR, Van de wal B W. Tuberculosis 1992 - The proceedings of an "Up Date" conference on Tuberculosis 1st ed. Langebaan. University of Stellen borsch 1992:216
12. Edwards C.R.W. Bonchier I.A.D, Hastett C. Davidson's Principles and Practice of Medicine. 17th ed, Edinburgh: Churchill Livingstone, 1995:1203

28. Park K. Parks Textbook of Preventive and Social Medicine 15th ed. Banarsidas Bhanot 1997 :629.
29. Murray, C.J.L., Results of direct observed short course. Chemotherapy in 112,842 Chinese patients with smear positive tuberculosis. Lancet, 1996. 347 : 358 - 62.
30. Mwinga, A. Tuberculosis treatment in developing countries. The Lancet 1995. 346: 811 - 813.
31. Raghu M.B, Patel Y.S, Chintu C, Chawla V. Tuberculosis Manifestation in Children. Medical Journal of Zambia 14(14):53-56.
32. Rieder HL. Drug-resistance tuberculosis : issues in epidemiology and challenges for public health. Tubercle Lung Dis. 1994; 75:321-2
33. Reider HL. Methodological issues in the estimation of tuberculosis problem from tuberculosis in surveys. Tubercle lung Dic 1995;76;114-21
34. Ronillin A, Perdriest S, Parrot R. Transmission of Tubercle bacilli: the effects of chemotherapy, Tubercle 1996;57:275-99.
35. Stott, H. How treatment has evolved. The magazine of the WHO 1982.
36. Tan, K.K. Singapore Medical Journal 1995. 36 (2) 11209 - 11.
37. TB cohort statistics from Lusaka Provincial TB and Leprosy Program 1995.
38. Tuberculosis guide for low income countries : International Union Against Tuberculosis and Lung Disease, 1994.
39. World Health Organisation . Tuberculosis in the era of HIV. A deadly partnership Geneva: World Health Organisation. 1996 (WHO/TB,96.204)
40. World Health Organisation . The HIV/AIDS and tuberculosis epidemics. Implication for TB control. Geneva: World Health Organisations, 1994 (WHO/TB/CARG(4) , 1994)
41. World Health Organisation. Tuberculosis-a global emergency. Geneva: World Health Organisation, 1994 (WHO/TB/94.177)
42. World Health Organisation. Guidelines for surveillance of Drug resistance In Tuberculosis. Geneva: World Health Organisation, 1994b (WHO/TB/94.178)

43. World Health Organisation. The HIV/AIDS and tuberculosis epidemics. Implication for TB control. Geneva: World Health Organisations, 1994 (WHO/TB/CARG(4),1994)
44. Zambia National AIDS/STD/TB and Leprosy programme, strategic plan, 1994 -1998: A time to act, A time to care. Lusaka , 1994

ANNEX 2

QUESTIONNAIRE ON OUTCOME OF TUBERCULOSIS TREATMENT IN SPUTUM POSITIVE PATIENTS AFTER EIGHT MONTHS OF CHEMOTHERAPY

Instructions to Research Assistants:-

Read through the questionnaire carefully and answer the questions by ticking, circling or writing answers in the space provided.

A. SOCIO – DEMOGRAPHIC DATA **DEPT. OF COMMUNITY MEDICINE**

- 1. File Number:
- 2. Age:
- 3. Sex: 1 = Male 2 = Female
- 4. Weight (Kg):
- 5. Marital Status:
1 = Single 2 = Married
3 = Divorced 4 = Separated 5 = Widow/Widower

- 6. Occupation:
- 7. Residential Address:
1 = Low cost 2 = Medium cost
3 = High Cost 4 = Out of Lusaka

B. OTHER DETAILS

- 8. Date of start of ATT:
- 9. Sputum result at start of ATT:

1 = Positive 2 = Negative

10. Drugs start of ATT

1 = Rifampicin, Isoniazid, Pyrazinamide and Ethambutal

2 = Rifampicin, Isoniazid, Pyrazinamide and Streptomycin

3 = Rifampicin, Isoniazid, Pyrazinamide

4 = Rifampicin, Isoniazid, Ethambutal

5 = Others:

11. Sputum results after two months of ATT

1 = Positive 2 = Negative

12. Continuation treatment after two months of initial treatment (intensive phase)

1 = Ethambutal, Isoniazid

2 = Rifampicin, Isoniazid

3 = Rifampicin, Isoniazid, Ethambutal

4 = Rifampicin, Isoniazid, Ethambutal and Pyrazinamide

13. Did the patient complete eight months of ATT?

1 = Yes 2 = No

14. If the answer to the above question is no, give details:.

.....
.....
.....
.....
.....

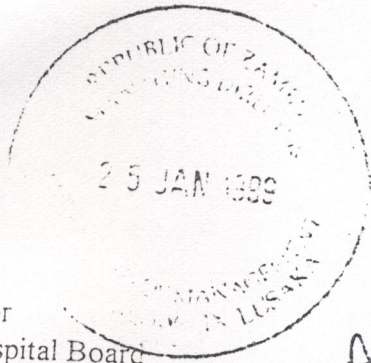
15. After how many months of A.T.T. did the sputum become negative?

1 = 2 months

2 = 5 months

3 = 8 months

University of Zambia
School of Medicine
Department of Community Medicine
LUSAKA



13 January 1999

The Managing Director
University Zambia Hospital Board
P. O. Box 50001
LUSAKA

Approved as recommended

[Signature]
DEPT. OF COMMUNITY MEDICINE
SCHOOL OF MEDICINE
UNIVERSITY OF ZAMBIA
P.O. BOX 50110, LUSAKA

Dear Madam,

RE: PERMISSION TO CONDUCT A RESEARCH ENTITLED "OUTCOME OF TUBERCULOSIS TREATMENT IN SPUTUM POSITIVE PATIENTS AT THE UNIVERSITY TEACHING HOSPITAL TB/CHEST CLINIC, FROM JANUARY TO APRIL 1999

Reference is being made to the above mentioned subject. I would like to inform you that the Research Ethics Committee for Post-Graduate Studies approved the above mentioned study in partial fulfillment for the degree of Master of Public Health academic year 1998.

The study is retrospective audit of tuberculosis files from January 1997 to December 1997. It has a sample size of 256 files. The results will contribute to the improvement of tuberculosis management in our hospitals.

In view of this study being conducted at your institution, permission to conduct the research is hereby being requested from your esteemed management.

Yours faithfully

Dr Semu C Mupakile
MPH STUDENT
DEPARTMENT OF COMMUNITY MEDICINE

cc. Head,
Department of Community Medicine

*From H. I. M.
I have no problem with this as long as fees are returned to their right place*
[Signature]
25/1/99

UNIVERSITY OF ZAMBIA LIBRARY
D 258735 ✓