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**A STUDY TO DETERMINE THE CONTRIBUTING FACTORS
TO THE HIGH PREVALENCE OF TUBERCULOSIS AMONG
NURSES IN THE UNIVERSITY TEACHING HOSPITAL IN
LUSAKA, ZAMBIA**

BY

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF COMMUNITY
MEDICINE, SCHOOL OF MEDICINE, IN PARTIAL FULFILLMENT FOR THE
DEGREE OF MASTER IN PUBLIC HEALTH**

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LUSAKA

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STATEMENT

I hereby certify that this study is entirely due to my sole and laborious scientific quest. The references depict my grateful acknowledgements of all the authorities on the subject that I consulted.

DECLARATION (COPYRIGHT)

I hereby declare that the work presented in this study for the Master in Public Health has not been presented either wholly or in part for any other Master in Public Health Degree and it is not being currently submitted for any other Degree.

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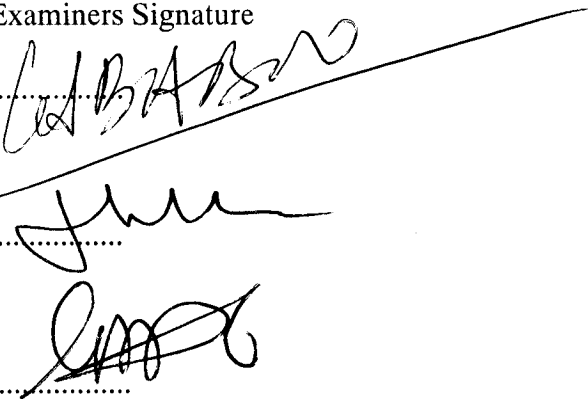
DEDICATION

I dedicate this study with the deepest love, gratitude and affection to the darling of my heart, my husband, Professor Mutale William Chanda who has been my source of inspiration throughout my study.

APPROVAL

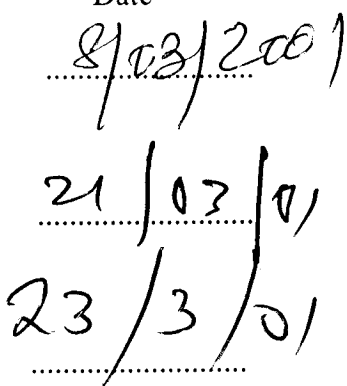
This dissertation of Mrs Dorothy Chinwendu Osigwe Chanda is approved as part of the fulfilment of the requirements for the award of the Degree of Master of Public Health by the University of Zambia.

Examiners Signature



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Date



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SUMMARY

This study was undertaken in order to identify the contributing factors to the high prevalence of Tuberculosis among nurses in UTH in order to design strategies for prevention of tuberculosis among nurses. It was noted that the rate of tuberculosis morbidity and mortality among nurses was increasing drastically. UTH personnel records showed that 8 nurses were treated successfully from tuberculosis between 1982 to 1984 when the nurses population was 1045. Comparatively, between 1993 to 1995, 64 nurses died from tuberculosis when the nurses population decreased to 849. So proportionately more nurses are dying now than before. The objectives of study were:-

- To identify both service and community factors that contribute to nurses developing tuberculosis.
- To establish the opinion of nurses towards tuberculosis prevention.
- To make recommendations to policy-makers regarding prevention strategies.

Literature reviewed were based on issues like socio-economic factors, management of tuberculosis patients and care of the health care providers.

The study was conducted at University Teaching Hospital in Lusaka with an establishment of 2656 workers. Data was collected using self-administered interview schedule, retrospective record review, observation of infection, prevention and control measures in the hospital and focus group discussion with 12 nurses.

Results showed that socio-economic factors did not significantly affect the outcome of tuberculosis, confirming the correct status of unconventional tuberculosis. There was irregular supply of items required to maintain basic hygiene practices. Mycobacterium tuberculosis was isolated from nursing care equipment like suction tubing, a pillow and a locker in ward environment.

Focus group discussions showed that nurses believe that instituting primary preventive measures and better nutrition schedule are much more important and meaningful than ward rotations as one can be rotated from one high risk ward to another. The study also showed that the level of exposure does determine the outcome of tuberculosis (P. value 0.0107868). Illustrated in the study is the fact that BCG does not guarantee protection against the acquisition of tuberculosis among nurses (P. value 0.04238011).

Retrospective case review showed that 4 (80%) out of 5 tuberculosis patients who defaulted had a relapse which could have been a multi-drug-resistant tuberculosis which is easily transmissible and difficult to treat.

The study also found out that, community and health-care work place factors seem to synergistically contribute to nurses acquiring tuberculosis. It was noted, though, that sometimes when the factors are analysed singly, they seem not to affect the outcome of tuberculosis.

It is for this reason that recommendations made for preventing and controlling tuberculosis should be multi faceted embracing the strengthening of the capacity of the health care delivery system to identify multi-drug resistant strains of mycobacterium tuberculosis in patients with tuberculosis relapse, improvement of the infection prevention measures in the health-care work

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JUST LIKE SEASONS, THERE ARE REASONS FOR THE PATH WE TAKE.

MY PATH IS TO BE OF SERVICE TO MANKIND. SO HELP ME GOD.

ANNEXES

. References

. Conceptual framework... ..

. Letter of permission to DHMT and authority

. Letter of permission to UTH and Directors and authority

. Authority from nursing administration to carry out the study

. Observation check-list... ..

. Focus Group Discussion Schedule

. Record Review

. Interview Schedule

. Consent Form

. Map of Zambia

. Marking key to knowledge questions

. Ghant Chart

LIST OF ABBREVIATIONS

ABBREVIATIONS/ACRONYMS

CDC - Centre for Disease Control.

NCID- National Centre for Infection Diseases.

NCPS- National Centre for Prevention services.

OSHA- Occupational Safety and Health Administration.

NIOSH- National Institute for Occupation Safety and Health.

OSHA- Occupational Safety and Health Administration.

BCG- Bacillus Calmette Guerin.

MDRTB- Multi-Drug Resistant Tuberculosis.

PPD- Purified Protein Derivative.

NATLC- National Tuberculosis and Leprosy Control.

TST- Tuberculosis Skin Test.

ATT- Anti Tuberculosis therapy.

NPVR- Negative Pressure Ventilation Rooms.

INH- Isoniazid.

CHAPTER 1

1.1 INTRODUCTION

Zambia is a landlocked country whose population stands at approximately nine (9) million (CSO 1996). The male population stands at 4,640 million while the female population stands at 4,699 million.(CSO 1996). Comparatively, it was 7,565,769 in 1989. That puts the annual projected growth rate at 3.3% per annum between 1996 - 2000. There are 9 provinces in Zambia and the growth rate varies in all of them. The country shares borders with the Democratic Republic of Congo and Tanzania in the North, Malawi and Mozambique in the East, Zimbabwe and Botswana in the South, Namibia in the South-west and Angola in the West of the country. (See map in annex). Politically, the advent of multi-party democracy has opened horizons for change, one of which is the introduction of health-reforms. This has brought with it, cost-sharing measures. As a result, the health-care consumers now have greater expectations from the health - care- delivery system. Lusaka became the capital city of Zambia at Independence because of its central position, abundant water supply and good climate. Currently the city of Lusaka has an estimated population of about 2.2 million (1999 CSO). With a growth rate of 5.6% 3.2% is natural and 2.4 is due to migration. The excessive growth rate has seriously hampered the quality referral services.

Lusaka houses the University Teaching Hospital (UTH) which is situated at its South-eastern part. The hospital serves as a curative, teaching, research, and caring centre. Therefore it serves as primary, secondary and tertiary sources of care. The Government, in an effort to decongest UTH, upgraded 10 urban health centres with the help of British Aid while the other four were

upgraded with the assistance of Irish -Aid. This made hospital beds available for the chronically-ill, like tuberculosis patients. These patients were not isolated due to overcrowding, and meagre hospital resources. This creates unhealthy working environment for carers who are very few compared to the number of patients under their care. This acute shortage of nurses is illustrated by the nursing establishment. Study done in UTH, states that UTH nurse-cadre establishment was 1,120 by the end of 1995 . Of these only 874 (78%) were filled by nurses, making a shortfall of 246. With the creation of the Central Board of Health (CBOH), 1,196 posts were created for nurses. Out of this 914 (76%) posts were filled, leaving a shortfall of 282. The shortfall, between the CBOH posts and the old UTH establishment which was 1,045 stands at 151. Besides this shortfall, the Voluntary Separation Package has further reduced the number of nurses to an all-time low of 774 (Nursing Administration Records 2000). Absenteeism has also rocked the hospital due to sickness. One of the major causes of sickness in all hospitals and health centres among both professionals and non-professionals, has been due to tuberculosis. This tuberculosis which was thought to be controlled during the early 80s suddenly started rising at such a high level that WHO, in 1993 declared it a global emergency. This three-fold increase is attributed to its association to HIV/AIDS. Nurses should be role models in maintaining good health, be mentally alert and physically agile so as to face the ever-surging challenges brought about by the advent of HIV/AIDS and global economic depression. This has caused acute shortage in the provision of patient-care. It is believed that this combination of disease not only engulfed the common illiterates but also many health care givers. Classical among these are nursing staff who are directly involved in health care. As a result, the health-care environment is harzadous due to increased number of tuberculosis patients being admitted. Tuberculosis and HIV/AIDS, are some of the commonest causes of admissions at the UTH.

TUBERCULOSIS SITUATION IN ZAMBIA

Van Broek et al (1999) reveals that Zambia is one of the countries with the highest number of tuberculosis in the world. Tuberculosis is rated as the biggest killer of economically-productive people who are infected with HIV-Aids in Zambia. It accounts for two-thirds of deaths each year. It is easy to get infected as the tubercle bacilli can be found anywhere in the air, being coughed and sneezed into the air by sufferers since tuberculosis is spread by aerosol. The Central Board of Health (CBOH,1999). noted that the number of reported tuberculosis cases has been rising rapidly in the last decade. The Ministry Of Health reports that between 1964 and 1984, the average case rate remained constant at 100/100,000 population. There were some 7,000 reported cases of tuberculosis in 1984. By the end of 1986, there was a sharp increase to 215/100,000 population. By 1994, it had risen to 400/100,000 population and to 425/100,000 population in 1996. In the-same year, there were 40,000 notified cases of tuberculosis accounting for more than 100 cases a day. Since the advent of Aids Epidemic in Zambia, the Tuberculosis case rate has increased nearly five - fold. The number of tuberculosis without HIV by the year 2010 is likely to remain the-same but those associated with the HIV infection are likely to increase by four - fold (CBOH 1999). The impact of HIV infection on tuberculosis is a serious problem because tuberculosis is contagious through casual contact. There are no demarcations or boundary wall as to who can have casual contact. This is free for all resulting in nearly 90% of the population being infected. The number of tuberculosis cases is estimated at about 50,000 cases by the year 2005. By 2010, there is likely to be, again, a five-fold increase and so the estimate of cases would be about 160,000 cases (CBOH, 1996). Increase in

tuberculosis cases causes a corresponding increase in the cost of its treatment. It lays an economic burden on both the nation and its sufferers. K600,000 is spent on drugs per person for the first six months. In the clinics, K120,000 is spent on each person per month. An average Zambian family of 6-7 people who earns an average income of K60,000-K150,000 per month cannot afford tuberculosis treatment. As a result, lack of treatment compliance, drug resistance and atypical presentation of tuberculosis surface. These have been compounded by BCG inefficacy as shown in studies conducted by Baboo et al (1999), Chintu et al (1980) and Waddel et al (1997). So other prophylactic and preventive measures should be found to protect the population at risk of acquiring tuberculosis.

STATEMENT OF THE PROBLEM.

There is a high prevalence of tuberculosis among nurses in UTH as a result of contact and exposure to hazardous environment both in the community and health-care setting. This could be attributed to increased number of patients being admitted with tuberculosis into hospitals and health-centres.

UTH Personnel Records (1998) showed that between 1982-1984, when the nurses population was 1045, only 8 nurses were successfully treated for tuberculosis. In contrast, between 1993-1995, when the nurses population decreased to 849 due to attrition, 64 nurses suffered and died from pulmonary tuberculosis. So proportionately more nurses are dying now than before.

A study conducted in the Department of Community Medicine (1996) showed that 18 out of 50 (36%), nurses died from pulmonary tuberculosis, Aids-Related complex, and Aids. During the same year, UTH recorded the highest mortality of nurses which stood at 27 when the population decreased to 827 (Table 1).

By 1997, a total of 114 nurses had died leaving a calculated nurses population of 800 (table 1). There is a probability that because of linkages with tuberculosis and HIV in the working places, nurses could be infected much more than the numbers quoted earlier.

In health care settings, V. Babus (1997) showed that tuberculosis morbidity risk among medical nurses exist in Zagreb, Croatia.

In 1993, WHO declared tuberculosis a global emergency. It estimated that between 1998-2020 nearly one billion people will be newly infected. Two hundred million will get sick and seventy million will die from tuberculosis if prevention measures are not strengthened.

So this study needs to be conducted in-order to identify the contributing factors of this malady in nurses and hence design strategies for prevention of tuberculosis among nurses.

Table 1

TUBERCULOSIS MORTALITY AMONG NURSES

YEAR	POPULATION OF NURSES	ENROLLED NURSES	REGISTERED NURSES	TOTAL	PERCENT AGE
1990-91	914	18	05	23	2.5%
1993	891	19	06	25	2.8%
1994	866	13	06	19	2.1%
1995	847	13	07	20	2.3%
1996	827	18	09	27	3.2%
1997 – Total	800	81	33	114	14.2%

(UTH Personnel Dept. 1998).

1.3 JUSTIFICATION OF STATEMENT OF THE PROBLEM

Recent analysis have shown that large proportion of knowledgeable, educated people have acquired tuberculosis. Of late, there has been a lot of concern expressed over the increased number of health-care workers falling ill and dying from tuberculosis. Hence this study targets nurses as front-line health-care-providers both in the hospital and the community with many tuberculosis patients. The sight of a nurse suffering from tuberculosis makes one feel uncomfortable as WHO states that an infected patient can infect 10-15 other people. If increasing number of nurses continue to absent themselves from work due to long-term illness

like tuberculosis, health-care institutions may face a shut-down as the younger generation may not want to dare into the nursing profession.

One of the hypothesis states that prolonged exposure and contact with the mycobacterium tuberculosis would predispose nurses to acquiring tuberculosis. This hypothesis needs to be proven or refuted since majority of the different categories of carers like medical Doctors, Clinical Officers, nursing assistants and classified daily employees have not all developed tuberculosis. Stead W.W (1967) states that latent tuberculosis should protect carers from acquiring tuberculosis in the presence of a strong immune system. The big question is that despite this theory of resistance, there is an alarming number of nurses suffering and dying from tuberculosis. Hence this study aims at finding out the contributing factors of tuberculosis among nurses. " Is it due to contact and exposure to the mycobacterium tuberculosis at the hospital and geo-location or are there other factors responsible for the high prevalence of tuberculosis among the nurses." Such a study has not been done before and the new information from this study will identify the exact causes of nurses acquiring and suffering from tuberculosis. Nursing professionals should utilise every available resource, like conducting this study, to arrest the overwhelming surge of tuberculosis which is threatening the future of health-care institutions in Zambia.

LITERATURE REVIEW

Globally, tuberculosis infection is now a source of great concern. Its association with the HIV virus has led to the emergence of non-conventional tuberculosis. Menzies et al (1995) noted that non-conventional tuberculosis is usually of the multi-drug resistant strain which is easily transmissible in health-care institutions and to the general population. This means that nurses are subjected to a double-trap of exposure to tuberculosis infection both in health-care institutions and in their varied geo-locations. Preventive measures have to be found to stem this infection both in the health-care institutions and communities.

WESTERN EXPERIENCE

In the Developed World many scientists went to work to prove infection rates, through the theory of contact and exposure to the mycobacterium tuberculosis in health care institutions and communities. One of these studies was carried out on new nurse-intakes in the USA.

Stead W.W. (1995) quoting, Israel et al (1941) who reported in the 1930s which is during the pre-HIV era, 48% of student nurses at Philadelphia General Hospital, became infected within the first year of working at the hospital, 86% within 2 years, and 100% within 3 years. Tuberculosis developed in 62 (9.7%) of these nurses. He went on to conclude that “it has been well shown that the greater the exposure, the greater the chance for developing clinical tuberculosis”. Zurlo J.J. (1996) reported that during the HIV/AIDS epidemic in USA, there is a “high skin test conversion rates among various groups of health-care workers at the hospital (respiratory therapy staff, 22%; general medical ward staff, 27%; and HIV ward staff, 50%)”. Menzies et al (1995) reported that multi-drug resistant tuberculosis has caused outbreak of tuberculosis in at least 12

hospitals. They went on to say that health-care workers infected with HIV are more susceptible to tuberculosis than those without HIV infection. Up to the time of publication of their article, 17 health-care workers (8 of whom were HIV positive) had multi-drug resistant tuberculosis, and 5 (4 of whom were HIV positive) have died.

Based on their studies, Menzies et al (1995) and Blumberg (1995) went on to suggest ways of preventing and protecting nurses from tuberculosis infection both in the health-care-settings through improved administrative, engineering and personal respiratory controls and in the communities through education of staff on safer life-style practices. Blumberg (1995) noted that adequate management of patients on admission would dramatically reduce both the carers exposure to tuberculosis and to tuberculin skin test conversion rates. This would entail proper isolation and timely-screening and diagnosis of patients. In addition, LoBue P.A. and Catanzaro A. (1998) and the American Thoracic Society recommend the use of Isoniazid tablets to be used as prophylactic treatment for workers with PPD results of equal to and more than 10mm. and who are more than 35 years of age. Nurses should be protected because Murray et al (1990) states that the WHO tuberculosis programme has projected an increase in tuberculosis mortality from 2.5 million in 1990 to 4 million in 2005. Also in Eastern Europe, there are over a quarter of a million tuberculosis cases per year. In South Eastern Asia, 3 million cases of tuberculosis occur each year. As can be seen, in Europe and the Americas, care is taken to prevent and protect nurses from acquiring tuberculosis in-order to protect the general public who interact with nurses.

SUB-SAHARA COUNTRIES EXPERIENCE

Coming nearer home, Harries et-al (1997) recently reported that 12 (4%) out of 310 nurses developed active tuberculosis over a 2 year period at a hospital in Malawi, a risk that is 40 times more than what it is in the community. This is due to an increase in the number of hospitalised tuberculosis patients in Malawi.

The-same trend is noted in Zimbabwe where Proudfoot et al (1981) noted that the number of registered tuberculosis patients doubled from 5848 in 1987 to 11710 in 1991 in Zimbabwe. where the case-detection rate was 469/100,000 population. This trend increases the chances of nurses contracting tuberculosis both at work and in the communities where they live.

ZAMBIAN EXPERIENCE

The country experienced an increase in the number of tuberculosis patients in the country. The Ministry of Health made efforts to alleviate the problem of increased number of patients with tuberculosis. It has ensured that the tuberculosis programme is one of the most cost-effective public-health interventions which can be compared to the oral Rehydration and Immunisation Programmes. It also included tuberculosis as one of the six health thrust packages at all levels of the health-care delivery. This ensured that most health-care givers receive instructions on clinical diagnosis of tuberculosis. It also increased their capability of rendering palliative treatment in the absence of medical doctors especially in rural areas. This exercise is being carried out by the Health Management Information Systems under the auspices of the various District Health Management Teams. This is an added improvement in the prevention of tuberculosis in Zambia.

THE PROCESS OF TUBERCULOSIS PROGRAMME IN ZAMBIA

In 1964, the new Zambian Government set up the National Tuberculosis Control Programme to monitor the incidence, prevalence and the treatment of tuberculosis in the country. Later in 1980, the tuberculosis and leprosy control programmes were merged since almost same treatment were used for both diseases. It was hoped that this move would improve accountability of both programmes. During that time, the male positive tuberculosis patients were nursed at the Kafue Gorge while the females were nursed at the Kabwe sanatoria. These two institutions were exclusively for infectious tuberculosis patients. Nurses observed strict isolation procedures in the care of these patients. The nurses were also put on tuberculosis prophylaxis for protection, hence the low morbidity among the nurses.

With the advent of HIV/AIDS pandemic, there occurred a morbid association between HIV/AIDS and tuberculosis and as a result there emerged on the scene two types of tuberculosis - the conventional and non-conventional tuberculosis- the later being associated with HIV/AIDs. An overwhelming increase occurred in the number of patients being admitted with tuberculosis with corresponding shortfall in the material and human resources to institute an appropriate and effective infection prevention and control measures in the wards. From 1991-1993, Zambia integrated the National Aids, Sexually-Transmitted Diseases into the Tuberculosis and Leprosy Programme to form the National Aids, Sexually- transmitted diseases tuberculosis and leprosy programme (NASTLP). This programme aimed at diagnosing 70% of the total estimated incidence of the new smear-positive pulmonary tuberculosis cases annually and to cure about 85% of them. In-order to achieve this aim, by the end of 1996, the Ministry Of Health was able to provide technology for diagnosing tuberculosis in 123, (12%) of all its health institutions. This move facilitated case - findings and case-holdings of tuberculosis patients. This also increased

the number of tuberculosis patients in UTH. Concurrently, an increase in the number of nurses suffering and dying from tuberculosis was observed.

TUBERCULOSIS SITUATION IN UTH

From 1990, the UTH. witnessed high rates of tuberculosis morbidity and mortality among nurses in the hospital (Administrative letter to infection control Unit, 1991). In 1992, the Hospital Infection Prevention and Control Committee (HICC) cultured mycobacterium tuberculosis from the delivery bed and baby-suction tube in the labour ward. Table 1 shows the mortality among nurses between 1990 to 1996. This is a serious state of affairs as a nurse with tuberculosis can infect her patients. WHO, said that "an infected person can infect 10-15 people in a year." This means that an infected nurse can infect so many patients causing patients to stay unnecessarily longer days in the hospital due to nosocomial infections.

Added to this, is the fact that between September 1997 and April 1998 two-hundred and thirty-two (232) nurses were attended to in the staff clinic suffering from different ailments. One hundred and thirty-five sick-off days (135) were given to sixty-three (63) of these nurses (staff Clinic records 1998). More recently, in 1999 the Hospital Infection Control Committee (HICC), in an effort to lower tuberculosis morbidity among nurses screened three hospital departments. Table 2 showed 14 (12.7%) out of 110 staff who were screened were found positive for Acid Fast Bacilli (AFB) (HICC,1998).

Table 2

UTH Tuberculosis Morbidity.(HICC Report, 1998)

LOCATION	NUMBER SCREENED	AFB RESULTS
Purchasing dept.	30	6(20%)
labor ward	49	4(8.16%)
operating theatre	31	4(12.90%)
TOTAL	110	14(12.72%)

(HICC REPORT, 1998)

These findings caused concern within the Hospital Board of Management. The Board tried to find solutions to this problem.

UTH EFFORTS TO ALLEVIATE THE PROBLEM

In-order to lower the morbidity due to tuberculosis among its carers, the UTH Board of Management effectively strengthened the already existing Infection Prevention and Control programme (HICC) of the hospital. In this programme, infection prevention and control lectures were set up for nurses update on tuberculosis. An occupational health unit was also set up to care and treat ailments and to conduct yearly Medical Exams for nurses. Records from staff clinic (1998) showed that most nurses do not utilise the staff clinic during periods of own illness for reasons ranging from poor services to the absence of a qualified medical doctor in the staff clinic. This is, however, debatable because UTH has the ability to provide basic diagnostic agents and chemotherapy for all its staff. It has been observed that those who suffer from tuberculosis and HIV infection do not like to expose their status either for fear of losing their jobs or being de-recognised in the community. Perhaps the nurses had the same fear resulting in depriving themselves from the facilities available in UTH.

UTH is overcrowded as shown in the basic statistics.

UTH BASIC STATISTICS

UTH bed capacity Stands at 1700. The Hospital admission policy does not allow exclusion of patients even when the bed complement is reached. The UTH has a policy of admitting all the patients who are referred. It is surprising to note that referrals throughout the city of Lusaka is much more higher than the bed capacity of UTH. Hence floor beds abound causing obvious congestion in the clinical areas with reduced bed status. Space for rendering care becomes very limited.

STAFF SITUATION

There is an acute shortage of nurses in the hospital. This has been worsened by the Voluntary Separation Package as table 3 shows.

The wards have a bed complement of 55 beds. These number of patients can be managed with ease by eight (8) Registered nurses, sixteen (16) enrolled nurses and ten (10) classified daily employees (cdes). Currently, a ward may be managed by one (1) or two (2) registered nurses, a nursing assistant and a casual daily employee. The wards are overcrowded and can have up to 70-80 patients. Nwaba, (1999), a ward sister in-charge, in her annual report stated that "staff levels are too low, to manage such numbers of patients.

Table 3.

Nurses Distribution After Voluntary Separation Package

AREA	N.O.	N/S.	RM./TN.	RN.	EM./PN	EN	TOTAL
A-BLOCK.	1	10		40		68	119
B-BLOCK	1	9	26	7	50	5	98
C-BLOCK	1	3		14		34	52
D-BLOCK	1	2	4	9	5	23	44
E-BLOCK	1	6		28		57	92
G-BLOCK	1	6		21		37	65
HCC.	1	5		25	5	43	79
TH/ICU	1	5	14	12	6	27	65
PHV.	1	5		19		52	77
SPCL.	1	2	2	7	8	22	42
CSSD	1						1
TOTAL	11	53	46	182	74	368	774

NURSING ADMINISTRATION, 2000

There is a corresponding increase in the number of hospitalised tuberculosis patients in the country. Between 1986 and 1998 there was a notable increase in number of patients admitted with tuberculosis in UTH alone as clearly illustrated next page.

Table 4.

TUBERCULOSIS CASES IN UTH. FROM 1986-1998.

IN-PATIENTS				OUTPATIENT ATTENDANCE
YEAR	ADMISSIONS	DISCHARGE	DEATHS	OUTPATIENT
1986	1682	1452	230	418
1987	2010	1730	280	1007
1988	2255	1908	347	1227
1989	2632	2069	563	1117
1990	2945	2250	695	912
1991	2994	2281	713	1127
1992	4139	3065	1074	569
1993	3704	2829	875	983
1994	3982	2849	1133	1934
1995	4886	3553	1333	2291
1996	5532	3904	1628	2583
1997	5782	4114	1668	3219
1998	7441	5358	2083	1802

(HEALTH INFORMATION, UTH. 1999)

In UTH., the admissions due to pulmonary tuberculosis increased from 1682 in 1986 to 7441 in 1998 while the mortality cases increased from 230 in 1986, to 2083 in 1998. In 1994 tuberculosis was the fifth common cause of admissions while in 1998 it became the second common cause of admissions. This is well illustrated in the table next page.

Table 5.

INCREASING NUMBER OF PATIENTS WITH PULMONARY TUBERCULOSIS

1994	Fifth common cause of admissions	3979
1995	Fifth common cause of admissions.	4894
1996	Fourth common cause of admissions.	6019
1997	Third common cause of admissions.	6981
1998	Second common cause of admissions.	7441

(UTH.HIS 1999)

The table shows the increase between 1994 and 1995; and increase between 1994 and 1998.

This increase in number of admissions means longer exposure periods for the nurses and therefore a corresponding increase in mortality and morbidity rates among carers.

Increased number of tuberculosis patients admissions indicate that UTH is invariably a focal point for transmission of tuberculosis with a large proportion of Lusaka province 20%-25% of nationally notified tuberculosis patients converging in either wards or chest clinic.

This trend causes overcrowding, and unhealthy clinical environment in the hospital. It becomes expensive in terms of man-power, man-hours and material needed to provide quality health-care for these patients as well as maintain a healthy work-force.

UTH is striving to maintain quality service in the face of competitive cost-sharing health-care delivery now in vogue.

UTH Efforts to lower the levels of sickness among its personnel by creating the HICC to protect nurses health, have not produced the desired effect, hence research-based data will provide the hospital management the necessary data to design strategies to prevent and protect nurses from acquiring tuberculosis infection.

TUBERCULOSIS IN THE URBAN HEALTH-CENTERS

In the community, thirteen health centres were visited in-order to establish tuberculosis infection rates among the nurses working in the Lusaka Urban Clinics. it was found out that morbidity rate of the nurses stands at 5% while the mortality rate stands at 4%.

This shows that this is just the right time to improve the Infection Prevention and Control Programme in the health-care- institutions under the factors stated below.

FACTORS CONTRIBUTING TO THE PREVALENCE OF TUBERCULOSIS AMONG NURSES

MANAGEMENT OF PATIENTS

Adequate management of tuberculosis patients is necessary in-order to lower tuberculosis morbidity among nurses.

In Zambia, before the health-reforms, sputum smear tests were sent to the Chest Disease Laboratory in Chelstone for diagnosis. This was one major source of delay in patient management and diagnosis as results used to come after some three months delay. Now through NASTLP, most health -care institutions are well-equipped with modern technology for tuberculosis diagnostic services. Now delays in patient-management is as a result of global economic depression. This causes lack of essential test reagents needed for prompt diagnosis,early and appropriate patient-management. Also patients are admitted on provisional diagnosis of tuberculosis. Broek et al (1997) reported that in 1996 over 40,000 tuberculosis cases were notified and that 50% of all these cases were sero-positive. Nettleman et al (1997) states that most HIV patients have multi-drug resistant tuberculosis which is easily transmissible

to carers. A study carried out by Elliot et al, (1993) state that HIV patients with pulmonary Tuberculosis may be less infectious than their HIV-negative counterparts because they have lower bacillary load in their sputum.

Delay in diagnosis of tuberculosis in HIV patients was noted by LoBue and Catanzaro A.(1998) due to atypical symptomatic presentations even in chest radiographic findings. Delayed diagnosis leads to delayed treatment and long exposure periods. For example, a patient with pleural effusion may require an insertion of intercostal chest drainage . This would necessitate longer in-patient days, more inhalation of the tubercle nuclei by carers in the ward environment.

WARD ENVIRONMENT

Literature reviewed show that the prevalence of tuberculosis can be improved by mounting an effective and efficient tuberculosis prevention, protection and control programmes in the ward environment which can be hazardous through which carers can acquire latent tuberculosis. The tubercle nuclei hangs in the air that we breathe, through which people acquire latent tuberculosis. Stead W.W.(1967) says that latent tuberculosis should be protective in the presence of a strong immune system. However, Canenti et al (1972) and Styblo K.(1997) feel that exogenous re-infection or cross infection is the principal cause of adult tuberculosis in developing countries.

Broek et al (1997) quotes NASTLP experts who state that tuberculosis has become the biggest adult killer in Zambia today and that the number of tuberculosis has risen out of proportion due to its lethal link with HIV/AIDS. This means more danger for the nurse who has more patient - contact hours in the clinical areas.

CROSS-INFECTION

In Zambia, like in most developing countries, cross-infection occurs in most medical wards because most patients are nursed together in the same wards. This increases the chances of nosocomial infections between staff and their patients. In our wards, where the bed-space has been reduced from 3 meters to one meter between beds, cross infection occurs very easily due to inadequate space for carrying out nursing care procedures. This situation is further compounded by the fact that there are a tremendous shortfall in patient-care items forcing nurses to compromise nursing care, having run out of ideas for improvising. Extensive literature search showed that Wells (1934) developed the concept of droplet infection and therefore, facilitated the understanding of aerosol spread of the mycobacterium tubercle. Riley et al (1962) believes that the ward environment can be very infectious as the tubercle nuclei is suspended in the atmosphere. This aids TST conversion rates in new nurse-intakes as proven by Cookson T. (1997) who quoted studies conducted by Israel and Hetherington in (1941).

This situation instills fear in the nurse while rendering care and leads to a lot of stress which affects their health status.

STAFF HEALTH STATUS

The staff health status is threatened by the emergence of multi-drug resistance strain (MDR) of the mycobacterium tuberculei. This type of tuberculosis can be very easily spread in the wards. The onset of tuberculosis can be detected by periodic medical examinations. With the cost-sharing measures in place nurses who cannot afford medical examinations continue to render care with fear of contracting the disease. Fear causes stress in the nurse.

Stress affects the health of the nurse coupled by the poor socio-economic status like poor housing, lack of adequate transportation system to get to work, poor salary, leading to poor nutrition and low immune status of the nurse and consequent exposure and infection with the tubercle nuclei. Michelle L. et al (1992) noted that MDR tuberculosis is characterised by a rapid progression from diagnosis to death and a strikingly high death rate of more than 80%. Patients are considered to have MDR. if the tuberculosis is resistant to two or more standard anti-tuberculosis drugs as stated by Cookson and Jarvis (1997). The implications of MDR. tuberculosis is that the patients remain infectious and therefore increase the transmission to other patients and their carers as well. Zurlo J.J.(1996) informs us that chemotherapy reduces tuberculosis infectivity as patients with susceptible tuberculosis strains become non -infectious within 14 days. He also cautioned us that it may take up to 3 months for patients with sputum positive to become sputum - negative hence smear positivity may not indicate infectivity. Hence nurses are cautioned to always go for medical examinations periodically in order to maintain their health-status. The study noted that although the UTH administration has put mechanisms for periodic medical exams for all of its staff, this is not strictly adhered to.

MEDICAL EXAMINATION

Nurses should be required to undergo half-yearly or annual medical exams to ensure that they have good health-status. With many patients being admitted with tuberculosis, Tuberculin Skin Test can be done to identify nurses who are infected with the mycobacterium tuberculosis before commencement of employment. Purified Protein Derivative (PPD) for skin testing can be used in administering Tuberculin Skin Tests on health-care providers. Jereb et al stated that it is not a diagnostic test. In late 1994, the American Thoracic Society/CDC published a guideline which

stipulated that if a new employee produces less than 10mm induration, a booster should be repeated within 10 days.

An employee with a TST reading equal to or greater than 10mm is required to have a chest x-ray. They state that it has an elastic relationship with tuberculosis infection and disease and that proper interpretation requires the appreciation of its many confounding factors including BCG vaccination, nutrition status, contact with open tuberculosis cases and immuno-suppression due to HIV infection.

PREVENTIVE THERAPY

Mwinga A. et al (1998) said that before the advent of HIV infection, people were given Isoniazid to prevent tuberculosis. This preventive therapy was shown to reduce incidence of active tuberculosis by more than 80%. During the HIV era, in industrialised countries preventive therapy has also been shown to prevent the reactivation of latent infection in HIV-infected persons. In 1991, studies carried out by Wadahawan D, et al in UTH Lusaka, Zambia, showed that isoniazid preventive therapy significantly reduced the incidence of active tuberculosis in HIV-infected persons. This was further confirmed by studies carried out by Whalen C.C. et al (1997) in Uganda, and Mwinga A. et al (1998) in Lusaka, Zambia. LoBue and Catanzaro (1998) and the American Thoracic Society recommend the use of Isoniazid (INH) for workers with a PPD of equal to or greater than 10mm. and who are more than 35 years of age. After evaluation, these people could be offered INH preventive therapy for 6-12 months duration but they also intimated that the 12 month option is a better option. The authors advised that a monthly Transaminase liver function test should be carried out as INH is hepatotoxic.

Mwinga A. et al (1998) stated that` with either twice weekly isoniazid for six months or a combination of rifampicin or pyrazinamide for 3 months reduced the incidence of tuberculosis in HIV infected persons in Zambia. They stated that the effect was greatest in the following persons

- persons with a positive TST of 5mm or greater
- persons with HB of 10g/dl or higher.'

In their study presented at ICASA they noted, that 62% of young HIV negative adults attending a sexually transmitted diseases clinic in Lusaka were TST positive. The study also showed that HIV is the greatest risk factor for the progression from latent to active tuberculosis with an annual risk of 5-8%, and that the consequent association between HIV. and tuberculosis is now widely recognised. .

The study concluded that the treatment of latent tuberculosis to prevent reactivation might be appropriate for Zambia which have high rates of HIV and tuberculosis infection.

The application of Mwinga`s findings could only be possible when health-care workers are fully conscientised to the importance of Voluntary Counselling and Testing (VCT). Hence Mwinga`s findings have very important implications on the topic under study which hopes to provide a base-line data for future studies.

Villarino M.E. et al (1996) cautioned against the use of BCG to people suspected to be infected with HIV infection for danger of developing disseminated tuberculosis.

KNOWLEDGE

Nurses are required to be knowledgeable about preventive measures in the health-care setting. The level of knowledge that a nurse possesses will influence the appropriate utilisation or under-

utilisation of the services provided at the Occupational Health Unit in the Hospital. The services provided in this unit have been established for the maintenance of staff health.

It is hoped that acquisition of this knowledge would help to change nurses attitudes to utilising the staff clinic during periods of own illness.

With the increase in the number of tuberculosis patients admitted in the hospital, nurses should be self-directive enough to acquire valuable available information on all aspects of non-conventional tuberculosis e.g. causes of, dangers of, and which patients are more predisposed to multidrug-resistance tuberculosis, and infection prevention methods inclusive.

A nurse with inadequate knowledge on the modern-day tuberculosis will have negative attitudes to rendering care. This inevitably leads to nurses compromising care coupled with irregular supply of health-care items needed to maintain proper hygiene in clinical areas. This scenario would increase the chances of nurses acquiring tuberculosis in health-care settings.

Hence inadequate knowledge may contribute to the high prevalence of tuberculosis among nurses.

In summary, all the above strategies advocated by these renowned medical Scientists and physicians including findings to be derived from this study after completion could be used in designing strategies and formulating policies which could be used by the University Teaching Hospital Board of Management to set up cost -effective Tuberculosis prevention and control programmes. It is hoped that this would help to lower the high prevalence of tuberculosis among its carers.

An epidemiologist by the name of Sepkowitz K. A.1996 identified the gap in studies conducted when he rightly noted that few studies have examined the incidence, prevalence or exposure-associated rates of infection or even specific interventions recommended to maintain worker-

safety hence this study attempts to study the contributing factors to the prevalence of tuberculosis among nurses in-order to design strategies for prevention.

As we enter the new millennium, it is right time to re-visit how well the health-care givers are protected against the threat of tuberculosis infection which hangs over them in the clinical areas and in the community. Health-care institutions offer us the ideal environment where we can exercise our abilities towards prevention and control of the transmission of tuberculosis.

Administrative Controls

In this study these would mean mechanisms laid down and enforced by the Hospital Management which would aim at preventing the exposure of nurses to persons with active infectious diseases, e.g. tuberculosis in the clinical areas.

Administrative Controls entail the following

- mandatory pre-employment medical examinations,
- yearly medical examinations including chest x-ray and tuberculosis Skin Tests using PPD.
- rapid identification of patients with active tuberculosis,
- diagnostic evaluation
- isolation of persons likely to have active disease e.g. tuberculosis.
- education and training of health care workers
- screening of health-care workers routinely.

Engineering Controls

Pugliese and Bartley 2000 quoting (OSHA 1999) the body which defines "engineering controls," as "controls that isolate or remove the blood-borne pathogens hazard from the work-place." " It says further: ` where engineering controls will reduce employee exposure either by removing, eliminating or isolating the hazard. "These aim at ensuring adequate ventilation, air cleaning through filtration, and the use of ultra violet radiation".

n this study, this would entail ensuring adequate through ventilation.

Personal Respiratory protection

These necessitate the use of face-masks where there is a known high-risk of tuberculosis infection to the health-care worker eg. in isolation rooms.

Bacillus Calmette Guerin (BCG)

These are live vaccines derived from a strain of mycobacterium bovis that was attenuated or weakened by Calmette and Guerin in Lille France.

Convertor

California's tuberculosis controller's association states that a converter is defined as one whose Purified Protein Derivative (PPD) reaction is at least 10mm in induration.

A Tuberculin Skin Test (TST) Conversion

This is defined as a documented positive test result following a documented negative result of a test done at the hospital by the members of the research team or at the staff clinic.

Reactor

The American Thoracic Society defined a reactor as anyone with a PPD reaction of 10mm or greater and who does not meet the criteria of a convertor.

Purified Protein Derivative

This is standardized in terms of its biological reactivity as tuberculin units (TU). An international standard is maintained by WHO against which the potency of other preparations is measured. The standard PPD has been arbitrarily designated as containing 50,000 tuberculin units per milligram. One tuberculin unit is equal to 0.01 of Old Tuberculin(TU).or 0.0002 mg PPD.

Delay

This is the time between the first visit to a doctor and actual diagnosis.

Patient's delay

This is time between reported onset of symptoms and first visit to a Doctor.

Tuberculosis exposure

In this study an episode of tuberculosis exposure is expected to occur when a patient not placed in isolation when admitted subsequently has a diagnosis of acid-fast bacilli smear positive and culture positive pulmonary tuberculosis and up to 2 weeks after discharge.

Days of tuberculosis exposure

This is defined as the cumulative number of days that patients with acid -fast bacilli pulmonary tuberculosis were not isolated.

Centre for Disease Control(CDC)

It is a non-regulatory federal agency responsible for developing practical guidelines for the prevention of disease transmission in the United States Of America.

CDC has three branches and these are the following:-

- National Centre for Infectious Diseases.
- National Centre for Prevention Services.
- National Institute for Occupational Safety and Health (NIOSH).

Niosh

It has a statutory responsibility to provide a scientific basis for the criteria that it recommends to OSHA.

Nosocomial

This means hospital-acquired disease or infection.

Occupational Safety and Health Administration(OSHA)

- It is the federal agency with legislatively established regulatory responsibility for work-place safety and health.

CHAPTER 2

OBJECTIVES

2.1 GENERAL OBJECTIVES

To describe the contributing factors to the high prevalence of tuberculosis among nurses in-order to design strategies for prevention of tuberculosis.

2.2 SPECIFIC OBJECTIVES

1. To identify whether working in medical wards and having both history of tuberculosis in the family as well as having tuberculosis patients living within 10 houses of nurses geo-location increase the risk of nurses developing tuberculosis. To identify other community factors that make nurses prone to tuberculosis.
2. To investigate practices that contribute to the high prevalence of tuberculosis among nurses.
3. To attempt to isolate the tubercle nuclei in the ward environment for the purpose of improving sanitation and ventilation in the clinical areas.
4. To establish the opinion of nurses on tuberculosis prevention and control in the health-care work-place.

2.3 RESEARCH HYPOTHESIS

1. The presence of droplet nuclei in an over-crowded ward and exposure to mycobacterium tuberculosis patients in the community increases chances of nurses developing tuberculosis.
2. Prolonged stay of nurses in the medical wards increases the risk of tuberculosis among them due to prolonged exposure periods.
3. Over-crowding of patients increases the risk of cross-infection among the care-givers (nurses).

2.4 RESEARCH QUESTIONS

1. Does the ward environment affect the prevalence of tuberculosis among nurses?
2. Are there any preventive measures in place to protect the nurses from acquiring tuberculosis in the health-care work-place?
3. Do nurses have enough knowledge on preventive strategies against tuberculosis?
4. How does the quality of management of tuberculosis patients affect the prevalence of tuberculosis among nurses?

CHAPTER 3

3.0

METHODOLOGY

3.1

THE STUDY DESIGN

This was a non-interventional, retrospective and cross-sectional study.

Phase I

Phase I is a retrospective record review where sputum-positive pulmonary tuberculosis patients files were considered to elicit information.

Phase II

This was a descriptive cross-sectional study where data was collected systematically by observation, self-administered interview schedule, clinical and laboratory investigations which were followed by chest x-ray examinations and Focus Group Discussions. These were done in order to clarify the phenomena under study. The information obtained would meet the research objectives, answer research questions, satisfy curiosity, establish associations where applicable and solve the problems posed in the study as noted by (Treece and Treece 1987). The information yielded were both qualitative and quantitative in nature. The qualitative components were used to describe those variables which were not measurable. This aspect helped to identify and explore those variables which gave insight into the contributing factors to tuberculosis among nurses.

The quantitative aspect were used to measure those variables which were measurable like age, marital status etc. etc.

The study identified several variables. The main variable was the dependent variable which was: Tuberculosis among nurses. Several independent variables were also identified (see annex 01). It is hoped that this study would provide base-line data for instituting Tuberculosis Prevention strategies.

3.2 STUDY SETTING

The study took place at the University Teaching Hospital. The time used for data collection was from first week of February to April 2000. The hospital is divided into various departments to facilitate the smooth running of the institution. All the departments of the hospital were involved since the nurses are rotated right round the hospital units and wards. The major reason for the choice is because the problem under study was identified at the hospital, this will facilitate implementing the preventive measures.

3.3 STUDY POPULATION, SAMPLING METHOD AND SAMPLING SIZE

TARGET POPULATION

The target population are the nurses who work at the hospital whose exposure to mycobacterium tuberculosis in the hospital and contact with patients in the community were established.

Table 6

STUDY POPULATION

STUDY POPULATION	STUDY UNIT
All age groups of nurses working in UTH.	1 Nurse.
Records of patients.	1 record.

Inclusion Criteria

- Any qualified general nurse registered with the General Nursing Council of Zambia.
- Any nurse who has had at least three months nursing experience.
- Any nurse who is known to be suffering from tuberculosis whose –
diagnosis was based on positive sputum smear tests,
- Highly suspicious opacities especially in the upper zones in the lungs seen in the chest
x- ray.
- Intermittent fevers compatible with tuberculosis signs and symptoms.

Exclusion Criteria

- Any nurse who is pregnant.
- Any nurse with less than three months nursing experience.
- Any nurse who is not registered with the General Nursing Council.

SAMPLING METHOD AND SAMPLING SIZE

The study used five groups of samples in-order to identify, complement, compare and find associations between the contributing factors to the high prevalence of tuberculosis among nurses in the hospital.

SAMPLE 1

The sample size was determined by using the single proportion method. The following calculation was made. The tuberculosis mortality rate was calculated to be 03% on the average. This mortality does not include those who are infected with the mycobacterium tuberculosis. Since the infection rate is higher than mortality rate, so the prevalence rate was approximated to 10%. The confidence level was put at 95%.

The width range is 5%-15%.

This gives the width interval of 5

standard error =SD/2 using the confidence interval of 95%

$$e = 5/2 = 2.5$$

$$N = P(100-P)/(e)^2$$

$$= 10 \times 90 / 6.25$$

$$= \underline{144}$$

SAMPLE 2

RETROSPECTIVE RECORD REVIEW

This was done in the first week in February. The study reviewed the records of the patients who were diagnosed as smear-positive pulmonary tuberculosis and were discharged from the medical wards in 1996. Five patients on the average get discharged daily in the medical wards. Since there are 6 wards in the medical department, 5 records were reviewed from each ward making a total of 30 files. The aim of the record-review was to ascertain the length of days taken to diagnose, treat and discharge each patient. The record-review focused on patients in the medical wards of E Block only. E Block is a medical block where male and female patients with medical conditions and smear -positive tuberculosis patients are admitted.

SAMPLE 3

FOCUS GROUP DISCUSSION

Since this study also seeks to obtain additional information on the opinions of nurses regarding tuberculosis prevention strategies, a focus group discussion comprising twelve nurses was held. Members were selected according to their willingness and convenience to participate in the focus group discussion.

SAMPLE 4

OBSERVATION OF INFECTION PREVENTION AND CONTROL IN THE WARDS

SAMPLE 5

• SAMPLING OF WARD ENVIRONMENT

Specimens were taken from the randomly-selected ward environment and equipment in an attempt to isolate mycobacterium tuberculosis organisms.

This was done in the clinical areas to see whether the environment of care supports transfer of infections like tuberculosis between nurses and their patients.

The overall sample size totals 156 nurses, and patients thus listed

- 30 patients case files were reviewed retrospectively,
- 12 nurses for focus group discussion
- 144 nurse-respondents. These were chosen through systematic sampling method which allows all the nurses an equal chance of participating in the study. This would ensure validity and generalisations can be made since this is a representative sample of the nurse-population.

3.4. DATA COLLECTION TECHNIQUE

Four collection techniques were used in this study. These are:-

- A self-administered interview schedule with both closed and open-ended questions. The closed- ended questions facilitated coding of the questions. The open-ended questions were used to ascertain the nurse-respondents knowledge on the mode of transmission, prevention, and protection from infection with the mycobacterium tuberculosis.

- **Retrospective record- review**

The records of thirty (30) patients who were diagnosed sputum smear positive pulmonary tuberculosis who were admitted and discharged in 1996 were considered.

Infection Prevention and Control Observation

- The clinical areas were observed to see if the minimum standards of infection prevention and control were maintained.

- Ward Sampling

Swabs were taken from within 10 cms. of patients` immediate environment to try to isolate some mycobacterium tuberculosis if any were present.

Focus Group Discussion

This was held with twelve nurses in-order to get their views on the following:-

- Nurses knowledge regarding the use of tuberculosis prophylaxis, transmission and prevention.
- Their feelings with regards to the prevalence of tuberculosis among nurses.

3.5 DATA COLLECTION PROCEDURE.

Data was collected during the month of February – April, 2000. In-order to conduct the study in the hospital and also to check the records of the patients, permission was sought from the

Managing Director of the UTH. Board of Management, unit managers and the Manager of the Health Information Systems. The following tasks were carried out.

(i) DISTRIBUTION OF INTERVIEW SCHEDULES TO THE NURSE-RESPONDENTS

The questionnaires were distributed to nurses who appeared on the systematic sampling list.

Each respondent received both verbal and written explanation of the purpose of the study as well as the questionnaires.

Each participant returned a signed consent if willing to join the study. Those who were off-duty were followed home where the same process was followed.

Appointments were made for:-

- the collection of three consecutive sputum specimens,
- the administration and the reading of the Tuberculin Skin Test result.
- the day for taking of the chest x-ray.

Questionnaires which were distributed to nurse-respondents were filled in and returned duly.

Well-structured questionnaires were prepared for the nurse-respondents to go through and fill in.

Before the distribution of the questionnaire, the respondents were familiarised with the questions.

Those nurses who gave history of tuberculosis were followed to their homes to identify any focus or reservoir of infection within the family or in the neighbourhood. This was in an attempt to identify contributing factors to the high prevalence of tuberculosis among nurses in the community.

Qualitative and quantitative responses were derived from the filled questionnaires.

(ii) RETROSPECTIVE CASE REVIEW

The average exposure periods of staff were arrived at, by directly calculating the number of days that the patients stayed in the wards before diagnosis was made, treatment commenced and patient discharged and by noting the number of hour-week worked by the nurses during the night-shift.

This number was then compared to the average length of stay that the infective patients with smear-positive pulmonary tuberculosis stayed in the ward before diagnosis was made, treatment commenced, and the patient discharged.

The discharge trend was usually within one or two days of commencement of treatment.

All the six medical wards in the hospital were conveniently chosen for this exercise.

(iii) INFECTION, PREVENTION AND CONTROL OBSERVATION.

a. Observation of ward environment

Bed-space was measured. The number of patients and staff were noted as were the availability of suction-machines, gloves, face-masks, number of wash-basins, type of taps, soap for hand-washing, and mechanism for hand-drying.

All these ward facilities are required to maintain a hazard-free working environment.

b. Ward Sampling

Samples were taken from patients` pillows, lockers, mattresses and suction-machines. Nurses come into direct contact with these items daily while on duty.

The samples were sent to the Chest Diseases Laboratory in Chelstone for microscopy and Culture in an attempt to isolate any mycobacterium tuberculosis within 10cms diameter of patients immediate environment.

(iv) Focus Group Discussion

Twelve nurses participated in the focus group discussion. One Research Assistant recorded the discussion. The FGD guide was used when asking the questions. Clarifications were requested when explanations were not clear. This initiated a higher response rate and made the session more livelier.

3.6 ETHICAL CONSIDERATIONS

This study involved some ethical considerations being a fairly sensitive study. Informed and signed consent was obtained from each nurse-respondent after explaining the purpose of the study. The respondents were also assured of confidentiality of the information that was obtained. Only the researcher had access to the completed study instruments. No names were written on the questionnaires; rather each questionnaire was coded.

Approval was obtained from the Research and Ethics Committee of the School of Medicine, University of Zambia to conduct the study. Permission to conduct the study was also sought

from the Managing Director of the UTH. Board to carry out the study in all the wards. The letters of permission to conduct the study are annexed.

3.7 TESTING OF METHODOLOGY/PILOT STUDY

The data collection tools were pretested at Chilenje clinic. This clinic was chosen by random selection from among the other clinics in Lusaka Urban. A total of 10 nurses took part in answering the questionnaires as well as in the FGD.

This was done two weeks before the actual study.

The objectives of the pilot study were the following:-

- To appraise the potential of the data collection tool to yield reliable and valid data.
- To see if the study-participants understand the phrasing and sequence of the questions.
- To determine the length of time it would take to interview one nurse.
- To identify and fill any gaps in the content of the tool.
- To see if the nurses would be willing to produce sputum specimens for AFB Testing as well as undergoing Tuberculin Skin Tests and Chest X-Ray Examinations.
- To get an insight of the difficulties to be encountered in carrying out these tests among the nurses.

The pilot study was very beneficial because some modifications were made thus:-

- Some objectives were changed and re-worded.
- Some gaps were identified, the phrasing of some questions were changed and more options were added to some closed questions. These changes enriched the content and updated the quality of the study.
- Some difficulties presented themselves during the pilot study e.g. collection of the three

early morning consecutive sputum specimens from nurses on night-shift.

- Refusal to go for Chest X - Rays based on fear of the unknown results.
- Refusal of the Tuberculin Skin Tests for fear of developing sores that would take a long time to heal.

Adequate measures were taken to overcome these difficulties which surfaced during the pilot study.

There were no problems with the FGD, so the FGD guide was not altered in any way.

3.8 LIMITATIONS OF THE STUDY

Time Constraint

This kind of study requires a lot of time, resources and abundant patience to withstand all the difficulties that surfaced during this study, which is multi-faceted and therefore required a lot of time for its completion.

After the completion of the first part (PART 1) six months were allocated for the completion of this study, this period proved to be quite short in-order to undertake this study on a large scale.

A lot of patience and understanding was exercised during this study over collection of sputum specimens, administering the tuberculin skin tests and their reading, taking chest x-rays due to changes in nurses' shifts. These changes were necessitated as most nurses had gone on Voluntary Separation Package.

Another limitation is that it has been difficult to assess the virulence, dosage and resistance of mycobacterium tuberculosis identified. These are important to conclude the research topic.

Despite all these constraints, the study persevered and fulfilled the necessary requirements.

Another limitation in the study is the fact that the isolation of tubercle bacilli from the ward environment was done on a small scale, thus introducing some bias. More samples could have been taken and the study undertaken under a laboratory designed -study.

3.9

PROJECT MANAGEMENT

The project was managed from January to June 2000. The University Teaching Hospital Board of Management in conjunction with the Central Board of Health will implement the recommendations of the project. The study was conducted with the aid of a work-plan illustrated in the Ghant Chart which is annexed.

CHAPTER 4

4.0 PRESENTATION OF RESULTS

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4.1

Data Presentation

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DATA PROCESSING AND ANALYSIS

The EPI-INFO - a computer statistical application and a Scientific Calculator were used for all the data processing and analysis. The raw data was primarily checked for completeness and internal consistency before being entered into the EPI-INFO. Responses from the FGD were used for comments and recommendations.

SECTION A

Table 7. THE NURSE-RESPONDENTS AGE-GROUP

AGE	NUMBER	PERCENTAGE	CUM.%AGE
20-24	30	20.8%	20.8%
25-29	44	30.6%	51.4%
30-34	33	22.9%	74.3%
35-39	14	9.7%	84.0%
40-44	9	6.3%	90.3%
45-49	9	6.3%	96.5%
50-54	5	3.5%	100%
TOTAL	144	100%	

Mean age =31.382, Median age= 24, Mode= 24, Minimum age =21.000,Maximum age =54

SD = 7.888, SE =0.657

Matrix 1

DEMOGRAPHIC DATA OF NURSE- RESPONDENTS

AGE-GROUP	MARITAL STATUS	EDUCATION LEVEL	SALARY
20-24=30 mean=23.3 mode=24. SD.=0.794 SE.=0.145	single-28 monogamy-2.	secondary-	>k100,000=29. <k100,000=1
25-29=44 mean=26.8 mode=27 SD.=1.344 SD.=0.203	single -28 monogamy -15 widowed-1	secondary	<k100,000=3 >k100,000=4.
30-34=33	single =3 monogamy=17 Divorced=3 widowed=5 separated=5		<k100,000=6 >k100,000=27
35-39=14 mean=37.2 mode=36 SD.=1.326 SE.=0.354	single=4 monogamy =5 polygamy=1 divorced=2 widowed=2	secondary	>k100,000=14
40-44=9 mean=42.3 mode=44 SD.=1.000 SE.=0.601	monogamy=2 widowed=4 divorced=3	secondary	>k100,000= 7. <k100,000=2
45-49=9 mean=46.44 mode=45 SD.1.424 SE=0.475	monogamy=3 polygamy=2 divorced=2 widowed=2	secondary	>k100,000=7 <k100,000=2
50-54=5 mean=50 mode=50 SD.=1.155 SE=0.667	monogamy=3 divorced=1 separated=1	primary=1 secondary=4	>k100,000=4 <k100,000=1

Table 8

WARD LOCATION AND SEX DISTRIBUTION OF NURSE-RESPONDENTS

WARD	MALE	FEMALE	TOTAL
A BLOCK	3 (15.7%)	16 (84.2%)	19
B BLOCK	1 (50%)	1 (50%)	2
C BLOCK	6 (24%)	19 (76%)	25
D BLOCK	0 (0%)	12 (100%)	12
E BLOCK	5 (19.23%)	26 (83.87%)	31
G BLOCK	4 (10.81%)	33 (89.18%)	37
CLINICS	0 (0%)	6 (100%)	6
PHASE V MEDICAL	2 (40%)	3 (60%)	5
ICU	2 (33.33%)	4 (66.67%)	6
THEATRES	1 (100%)	0	1
TOTAL	24	120	144

Table 9

ASSOCIATION BETWEEN RESIDENCE AND TUBERCULOSIS AMONG NURSE-RESPONDENTS

RISK FACTOR	TUBERCULOSIS		
	YES	NO	TOTAL
GEOLOCATION			
HIGH DENSITY	4 (12.5%)	28 (87.5%)	32
MEDIUM DENSITY	9 (11.53%)	69 (88.46%)	78
LOW DENSITY	3 (8.8%)	31 (91.18%)	34
TOTAL	16 (11.11%)	128 (88.89%)	144

Chi square=0.26, Degrees of Freedom = 2, P.Value = 0.87938272

Table 10

RELATIONSHIP BETWEEN AGE AND TUBERCULOSIS AMONG NURSE RESPONDENTS

	TUBERCULOSIS		
AGE	YES	NO	TOTAL
20-24	0 (0%)	30 (100%)	30
25-29	3 (6.82%)	41 (93.18%)	44
30-34	6 (18.18%)	27 (81.82%)	33
35-39	2 (14.29%)	12 (85.71%)	14
40-44	3 (33.33%)	6 (66.67%)	9
45-49	1 (11.11%)	8 (88.89%)	9
50-54	1 (20.0%)	4 (80.0%)	5
TOTAL	16 (11.11%)	128 (88.89%)	144

Chi square = 11.28, Degrees of Freedom=6, P value 0.07997633

Table 11

ASSESSING THE EFFECT OF MARITAL STATUS TO NURSE-RESPONDENTS DEVELOPING PULMONARY TUBERCULOSIS.

RISK FACTOR	TUBERCULOSIS		
Marital Status	Yes	No	Total
Single	12 (12.37%)	85 (87.63%)	97
Married	04 (8.51%)	43 (91.49%)	47
TOTAL	16 (11.11%)	128 (88.89%)	144

Relative Risk =1.45 (0.50, 4.27), Confidence Limits = 95%, Chi square = 0.48, P. Value = 0.4894495

Table 12

ASSESSING THE INFLUENCE OF SEX ON TUBERCULOSIS AMONG NURSE RESPONDENTS.

RISK FACTOR SEX	TUBERCULOSIS		
	YES	NO	TOTAL
FEMALE	15 (12.5%)	105 (87.5%)	120
MALE	1 (4.17%)	23 (95.83%)	24
TOTAL	16 (11.11%)	128 (88.89%)	144

Relative Risk =3.00 (0.42,21.65), Confidense Limits=95%, Chi square=1.41 , P.Value = 0.2356799

Table 13

RELATION BETWEEN AGE AND KNOWLEDGE AMONG NURSE-RESPONDENTS REGARDING TUBERCULOSIS.

AGE GROUP	EXCELLENT KNOWLEDGE	GOOD KNOWLEDGE	FAIR KNOWLEDGE	INADEQUATE	TOTAL
20-24	0 (0%)	15 (50%)	14 (46.67%)	1 (3.33%)	30
25-29	1 (2.27%)	21 (44.72%)	20 (45.45%)	2 (4.55%)	44
30-34	1 (3.03%)	12 (36.36%)	18 (54.55%)	2 (6.06%)	33
35-39	0 (0%)	5 (35.71%)	9 (64.29%)	0 (0%)	14
40-44	0 (0%)	2 (22.22%)	7 (77.78%)	0 (0%)	9
45-49	0 (0%)	0 (0%)	8 (88.89%)	1 (11.11%)	9
50-54	0 (0%)	1 (20%)	4 (80%)	0 (0%)	5
50-54	02(1.39%)	56 (38.89%)	80 (55.56%)	06 (4.17%)	144

Chi Square = 15.47, DF = 18, P-value = 0.629166268

Table 14

ASSESSING WHETHER WORKING IN A MEDICAL WARD IS A RISK FACTOR TO NURSES DEVELOPING PULMONARY TUBERCULOSIS

RISK FACTOR	TUBERCULOSIS		
WARDS	YES	NO	TOTAL
Medical	13(16.25%)	67(83.75%)	80
Surgical	03(4.69%)	61(95.31%)	64
Total	16(11.11%)	128(88.89%)	144

RR. =1.84, Confidence level = 95%, Chi square = 5.32, P.Value = 0.02822476

Table 15

TO DETERMINE WHETHER DURATION OF STAY IN A MEDICAL WARD CAN AFFECT THE DEVELOPMENT OF TUBERCULOSIS AMONG NURSE-PARTICIPANTS.

RISK FACTOR	TUBERCULOSIS		
Period of stay	Yes	No	Total
<2 years	1 (1.6%)	63 (98.44%)	64
>2 years	15 (18.75%)	65 (81.25%)	80
Total	16 (11.11%)	128 (88.89%)	144

Relative Risk= 0.08(0.01, 0.61), Confidence limits = 95%, Chi square =10.63

P. Value = 0.0011098

Table 16a

CHEST DISEASES LABORATORY ISOLATES FROM MEDICAL WARDS.

MEDICAL WARDS	TOTAL	DATE	LAB NO	TB.BACILLI ISOLATED
E11-Locker s/w	3	27/3/2000	1112	3 AAFB
PHV.ADM.- Suction machine	1	27/3/2000	1120	3+AAFB
EO2-Pillow s/w	3	27/3/2000	1108	2 AFB

Table 16b

DOCUMENTATION OF INFECTION PREVENTION OBSERVATIONS IN CLINICAL AREAS.

RISK FACTORS	OUTCOME OF OBSERVATIONS		
FACILITIES	ADEQUATE	INADEQUATE	TOTAL
Sterilisation	12(31.58%)	26(68.42%)	38
Sputum disposal	01(2.78%)	35(97.22%)	36
Face mask	01(2.63%)	37(97.37%)	38
Suction Machine	11(28.95%)	27(71.05%)	38

Table 16c

OUTCOME OF OBSERVATIONS

FACILITIES	OUTCOME OF OBSERVATIONS		
	ADEQUATE	INADEQUATE	TOTAL
change of gloves	29(76.32%)	09(23.68%)	38
gloves	30(78.95%)	08(21.05%)	38
Types of tap	01(2.63%)	37(97.37%)	38
Soap	01(2.63%)	37(97.37%)	38
Guidelines	34(89.47%)	04(10.53%)	38
Isolation	01(2.63%)	37(97.37%)	38

Table 17

UTH. LABORATORY ISOLATES FROM SURGICAL WARDS AND LABOUR WARD.

WARDS	YEAR	DATE	LABORATORY ISOLATES
Phase 3 Theatres - floor - sink	2000		- Pseudomonas Aeruginosa - Staph. Aureus
C Block Theatres - Floor in passage between Theatres. - Sink in passage between theatres.	2000		- Pseudomonas Aeruginosa - Pseudomonas Aeruginosa
Labour ward - Delivery bed mattress. - Suction Tubing on resuscitation machine. - Sink in Resuscitation room.	2000 27/3/00.	1122(C D.LAB).	- Staph.Aureus - Atypical TB. Bacilli - Pseudomonas Aeruginosa
D11 - room 2 - Floor - Baby-cot	2000	February	- Pseudomonas Aeruginosa - Pseudomonas Aeruginosa
Do1 Room 2 - Sink -Incubator	2000	February	- Pseudomonas Aeruginosa - Staph. Aureus

Table 18

ASSESSMENT OF DEVELOPMENT OF TUBERCULOSIS AMONG NURSES WITH A HISTORY OF TUBERCULOSIS IN THE FAMILY (WITH AT LEAST ONE CONTACT).

EXPOSURE	TUBERCULOSIS		
Tb. in Family	Yes	No	Total
Yes	09 (13.24%)	59 (86.76%)	68
No	07 (9.21%)	69 (90.79%)	76
Total	16 (11.11%)	128 (88.89%)	144

Relative Risk 1.44 (0.57, 3.65), Confidence limit =95%, Chi square =0.54

P.Value = 0.4429524

Table 19

DETERMINING WHETHER ACTUALLY STAYING WITH PATIENTS SUFFERING FROM TUBERCULOSIS PREDISPOSES NURSES TO DEVELOPING TUBERCULOSIS.

EXPOSURE	OUTCOME - TUBERCULOSIS		
Stayed with tb.patient	Yes	No	Total
Yes	06 (6.31%)	89 (93.68%)	95
No	10 (20.41%)	39 (79.59%)	49
Total	16 (11.11%)	128 (88.89%)	144

Relative Risk = 0.31 (0.12, 0.80), Confidence limits = 95%, Chi square = 6.50, P.Value =0.0107868

Table 20

ASSESSING THE RISK OF ACQUIRING PULMONARY TUBERCULOSIS AMONG NURSE-RESPONDENTS WHO HAVE PATIENTS SUFFERING FROM TUBERCULOSIS LIVING WITHIN TEN HOUSES OF THEIR NEIGHBOURHOOD.

EXPOSURE	TUBERCULOSIS		
	YES	NO	TOTAL
TB.patients within neighbourhood.			
YES	09 (11.84%)	67 (88.16%)	76
NO	07 (10.29%)	61 (89.71%)	68
TOTAL	16 (11.11%)	128 (88.89%)	144

RELATIVE RISK =1.15 (0.45, 2.92), Confidence limits =95%, Chi square = 0.09

P.Value = 0.7679301

Table 21

ASSESSING WHETHER NURSE-RESPONDENTS WHO WORK IN MEDICAL WARDS AND WHO HAVE BOTH HISTORY OF TUBERCULOSIS IN THE FAMILY AS WELL AS HAVING TB. PATIENTS LIVING WITHIN TEN HOUSES OF THEIR GEO-LOCATION HAVE INCREASED RISK OF DEVELOPING PULMONARY TUBERCULOSIS.

EXPOSURE	TUBERCULOSIS		
	YES	NO	TOTAL
Medical wards,History of TB in family, TB. pts. within 10 houses.			
YES	09 (12.1%)	65 (87.84%)	74
NO	04 (66.6%)	02 (33.33%)	06
TOTAL	13(16.25%)	67 (83.75%)	80

Relative risk = 0.18 (0.08, 0.42), Confidence limit = 95%, Chi square = 12.11,P.Value = 0.005002

Table 22

ASSESSING THE RISK OF DEVELOPING PULMONARY TUBERCULOSIS AMONG NURSES WORKING IN MEDICAL WARDS AND HAVING TB. PATIENTS LIVING WITHIN TEN HOUSES OF THEIR GEO-LOCATION.

EXPOSURE	TUBERCULOSIS.		
Medical wds.and ten houses within the neighbourhood.	YES	NO	TOTAL
YES	12 (30.77%)	27 (69.23%)	39
NO	04 (3.81%)	101 (96.19%)	105
TOTAL	16 (11.11%)	128 (88.89%)	144

Relative risk =8.08 (2.77, 23.55), Confidence limits = 95%, Chi Square = 20.93.,

p.Value = 0.0000048.

Table 23

INFORMATIVE TABLE ON THE RESULTS OF TUBERCULIN SKIN TEST ON NURSE-RESPONDENTS.

Cadres	-ve	<5mm	5-<10mm	10-20mm	20-40mm	Total
Sister	02 (40%)	01 (20%)	01 (20%)	01 (20%)	0 (0%)	05
ZRNM	01 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	01
ZRN	16 (43.24%)	02(5.41%)	14 (37.84%)	13 (35.14%)	02(5.41%)	37
ENM	0	0	0	0	0	0
EN.	37	0	21	28	5	91
TOTAL	56 (38.89%)	03(2.08%)	36 (25.0%)	42 (29.17%)	07(4.86%)	144

Table 24

VALIDATING TUBERCULIN SKIN TEST WITH CHEST X-RAY.

TST. RESULT	TUBERCULOSIS		
DIAMETER	YES	NO	TOTAL
<10MM	06 (6.32%)	89 (93.68%)	95
>10MM	10 (2.04%)	39 (79.59%)	49
TOTAL	16 (11.11%)	128 (88.89%)	144

Relative Risk = 0.31 (0.12, 0.80), Confidence limit = 95%, Chi Square = 6.50

P. Value = 0.0107868.

Table 25

EVALUATING THE EFFECT OF BCG ADMINISTRATION IN CHILDHOOD AND ADULTHOOD AS A PREVENTIVE MEASURE AGAINST PULMONARY TUBERCULOSIS AMONG NURSE-RESPONDENTS.

PREVENTIVE MEASURE.	TUBERCULOSIS		
BCG.	YES	NO	TOTAL
As a child	06 (4.6%)	122 (95.31%)	128
As an adult	10 (62.5%)	06 (37.5%)	16
Total	16 (11.11%)	128 (88.89%)	144

Relative Risk =0.08 (0.03, 0.18), Confidence level = 95%, Chi square = 48.13,

P.Value = 0.0000000.

Table 26

NURSES' MAN-HOURS DURING NIGHT -SHIFT

NUMBER OF HOURS NIGHT SHIFT	LONGEST WARD WORKED					TOTAL
	MEDICAL	PAEDS	SURGICAL	CLINICS	OBS & GYNAE	
LESS THAN 12 HOURS	1 (50%)	0	1 (50%)	0	0	2
MORE THAN 12 HOURS	79(57.25%)	19(13.77%)	29(21.01%)	1(0.72%)	10(7.25 %)	138
NOT APPLICABLE	0 (0%)	1 (25%)	2 (50%)	0	1 (25%)	4
TOTAL	80(55.56%)	20(13.89%)	32(22.22%)	1(0.69%)	11(7.64 %)	144

Chi Square = 6.92, DF = 8, P-Value = 0.54578572

Table 27

LONGEST PERIODS WORKED IN MEDICAL WARDS

RISK FACTOR	PERIOD WORKED IN LONGEST WARD			
	UNDER 1 YEAR	1-3 YEARS	MORE THAN 3 YEARS	
NUMBER OF HOURS OF NIGHT SHIFT				
LESS THAN 12 HOURS	2 (100%)	0 (0%)	0 (0%)	2
MORE THAN 12 HOURS	37 (26.81%)	40 (28.99%)	61 (44.20%)	138
NOT APPLICABLE	0 (0%)	0 (0%)	4 (100%)	4
TOTAL	39 (27.08%)	40 (27.78%)	65 (45.14%)	144

Chi-Square = 10.35, DF = 4, P-Value = 0.03493938

Table 28

DETERMINING THE EFFECT OF DOING MORE THAN ONE YEARS'NIGHT-SHIFTS TO DEVELOPING TUBERCULOSIS AMONG NURSES.

RISK FACTOR.	PULMONARY TUBERCULOSIS.		
PERIOD OF NIGHT SHIFT.	YES.	NO	TOTAL.
<1 YEAR.	0 (0%)	39 (100%)	39
>1 YEAR.	16 (15.23%)	89 (84.76%)	105
TOTAL.	16 (11.11%)	128 (88.89%)	144

Odds Ratio = 0.00 (0.00, 0.76)., Chi Square = 6.69., P.Value = 0.0097189.

SECTION B

RETROSPECTIVE CASE REVIEW

Province	:	Lusaka
Town	:	Lusaka
Specific site for review	:	Health information unit
Age Group	:	All Adults
Range of Dates Of Admission	:	1/3/96 - 26/4/96
Number of records reviewed	:	30
Record Review Begun	:	22/3/2000 - 25/3/2000

Characteristics of the Patients

Educational Background	:	Varying from elementary-technical education.
Diagnosis	:	Pulmonary Tuberculosis
Diagnosis by	:	3 Positive smear-sputum tests
Process of admission	:	Referred from local clinic to UTH- Filter - Phase V Medical unit - Medical ward by the admitting Unit.
Discharged	:	All patients were discharged through Chest Clinic for notification and follow up.

Objective of Retrospective case review.

To calculate patient - exposure days from the length of days it takes to diagnose commence treatment and discharge a patient with pulmonary tuberculosis.

To find the number of defaulting patients.

Patient-Exposure Days

The maximum number of patient-exposure days were 37 days, minimum number of days of exposure stood at 1 day while the mean was 13.667 days. The standard deviation was 11.071 days and the standard error was 2.0213days.

Table 29

ASSESSING WHETHER DEFAULTING FROM ANTI-TUBERCULOSIS TREATMENT INCREASES PATIENTS' CHANCES OF RELAPSE

RISK FACTOR	OUT COME OF TUBERCULOSIS RELAPSE		
	Yes	No	Total
Default	Yes	No	Total
Yes	04 (80%)	01 (20%)	05
No	03 (12.5%)	21 (87.5%)	24
Total	07 (24.13%)	22 (75.86%)	29

Relative Risk = 6.40 (2.04, 20.12), confidence limits = 95%, Chi Square =10.30

P.Value = 0.00133323

Thirty (30) patients whose records were reviewed retrospectively were all sputum-smear positive pulmonary tuberculosis patients. This means that they were all infectious and could have transmitted the tubercle bacilli as in-patients as well as in the community, especially before diagnosis was made and treatment commenced. These patients were admitted in the hospital where diagnosis was made. Admissions of these patients were made on the basis of clinical manifestations, which gave impression of tuberculosis-like disease. The X-ray films showed cavities and shadows, which prompted immediate treatment. All these 30 patients were smear sputum positive on different occasions. Nine 9 (30%) of these were smear positive on first

admission while 21 (70%) were not. Ten 10 (33.33%) of these became smear positive during second admission leaving 11 (36.66%) who became smear positive on their third admission. One cannot understand the delay in the appearance of mycobacterium during sputum testing because all of these were smear tested but became positive at different occasions. This means that if they received treatment they did not convert to smear negativity. In the past, diagnosis did not become so complicated as it is being observed now, this could be due to interference of a viral disease. It should not be ignored that the attending physicians did not have any doubts in their minds of the probability of tuberculosis, and promptly treated all of them against tuberculosis. Despite these steps taken, some of these patients had relapse and required re-admission. The cause of relapse and re-admission was because of defaulting in their treatment amongst five patients (table 29). If five (16.66%) out of 30 had defaulted then further investigations will give the probability of very high defaulting rate among tuberculosis patients. One cannot specify the exact causes of defaulting. Kamanga's study 1998, has shown lack of adherence and compliance to treatment to be factors responsible for defaulting in tuberculosis patients. Other studies have also stated that social factors can be contributing factors to defaulting. Patients, specifically women of younger age group do not like to reveal their infection. They prefer to seek treatment quietly. On slightest improvement, they prefer to adopt normal behaviour as if nothing has happened. These, when they don't complete their treatment, acquire tuberculosis of a very serious type requiring immediate admissions. Relapse of tuberculosis occurs in patients who have defaulted. These may have multi-drug resistant strain of mycobacterium tuberculosis. Relapse also occurs in patients who have been subjected to under-treatment due to lack of drugs. Table 29 shows that there is an association between default as a risk factor and tuberculosis relapse (P.Value 0.00133323). WHO has given a

guideline that DOTS strategy should be implemented in order to avoid these complications in hospitals and health centres. John Croft (1992) in his book clearly states that sputum testing should be done at least three times during anti-tuberculosis therapy, that is for short time regimen in 3 and 6 months. For the 8 month regimen 3rd, 5th and 8th months. This would ensure successful treatment. It should be noted that relapse does not occur if the treatment is successful and positive sputum has become negative.

SECTION C

FOCUS GROUP DISCUSSION WITH NURSES

Province	:	Lusaka
Town	:	Lusaka
Venue	:	Department of Community Medicine, UTH.
Age Group	:	Nurses aged 24-38
Language used	:	English
Date	:	26/03/2000
Time ended	:	10.50 hours

Characteristics of the group

Professional background	:	2 Ward Sisters
	:	2 Registereed nurses
	:	6 enrolled nurses
	:	2 Enrolled midwives
Marital Status	:	4 were married
	:	6 were single
	:	1 was widowed
	:	1 was divorced

Topics Discussed.

Topic one

Knowledge regarding transmission of tuberculosis

All the nurses defined tuberculosis as an air-borne, infectious disease caused by the mycobacterium tuberculosis. It can attack any part of the body especially the lungs. It is transmitted through droplet. Nurses said " when infectious patients speak or cough out, every body else inhales it and becomes infected: it can also be ingested." All the nurses know that tuberculosis is very common in 'HIV/AIDS patients and the under-privileged.'

They cited reasons for the high rate of transmission as follows:

- lowered immunity due to poor diet.
- lack of barrier nursing of infected patients
- lack of protection
- lack of patient health-education.
- lack of nurses update on Tuberculosis

Protection

All the nurses know that BCG given at childhood and adulthood can be protective to a certain extent.

Even though the nurses have requested for a second dose of BCG as a preventive therapy during entry to nurse training schools, there is a need for these nurses to be informed on the current status on the efficacy of BCG in adults. BCG has been proven to provide protection in children

only. Even this has become a controversial issue because various studies in South India and the UTH Lusaka Zambia, have shown the inconsistency in the protection rendered to children when given BCG at birth. This is attributed to either by the interference of an environmental bacteria or the sero-status of the child, where BCG is found to be non-effective or even provoke disseminated tuberculosis among HIV positive children. Therefore the nurses in the UTH need to be educated that BCG has no role as far as prevention of tuberculosis in adults is concerned.

Most did not know about the preventive properties of INH and the WHO guideline of giving INH only to HIV positive patients.

Four (4) (33.33%) nurses said they are willing to undergo the HIV test in-order to benefit from the INH preventive therapy while eight (8) (66.66%) nurses said they would not undergo the HIV test. There is need to sensitise the community and the nurses to undergo mandatory sero-testing which could reveal any possible exposure.

All the nurses insist that proper nutrition and observation of Infection prevention measures are much better than the effect of all the TB prophylaxis.

All the nurses know that updating their knowledge on the latest developments on tuberculosis would help lower infection rates among nurses by improving their practices.

Posters on hospital corridors warn visitors and bar children from visiting hospital wards due to its hazardous nature, nurses wonder what the hospital management are doing to protect nurses who work in the-same environment.

Topic two

Nurses feelings with regards to the prevalence of tuberculosis among nurses.

Nurses' feelings are those of loss of hope as they see what the sick nurses go through when sick as one day they might also be subjected to the same fate.

All the nurses feel that

Nurses seek medical attention very late during periods of own illness for fear of lack of care from fellow nurses.

Nurses require privacy when sick from patients they nurse.

Nursing Officers should have a policy of reserving side-wards, linen and drugs for sick nurses.

They need management support when sick in terms of

- early intervention

- regular supply of drugs so they can finish their treatment

- good diet

- well-ventilated environment

- visitation from the hospital management.

These were some of the comments received from nurses who participated in FGD.

Topic three

Suggestions on how to prevent transmission of tuberculosis among nurses

Prevention of infection can be achieved by practising proper infection prevention measures

which are the following:

- Nurses attending to tuberculosis patients should observe all barrier- nursing procedures.
- Provision of well-balanced diet for nurses working in these infectious disease wards as well as putting them on safe prophylaxis this could be gradually extended to all other nurses as available financial resources allow.
- By providing counseling services for nurses.
- By shortening the night-duty hours. This would entail training and employing more nurses.
- By educating nurses on the latest issues on tuberculosis.
- By conducting free medical exams on a yearly basis.
- By strengthening local clinics to carry out sputum tests on suspicious patients and commencing treatment there.
- Nurses need preferential treatment when sick, e.g.
- Nurses require free Tuberculin Skin Tests
 - free sputum tests
 - free chest x-rays
 - a sick bay where sick nurses can be attended to.
 - By rotating nurses every six months.

However, all the nurses agreed that effecting preventive and protective measures are much more important than ward-rotation as one can be rotated from one high risk ward to another.

CHAPTER 5

5.0 DISCUSSION OF FINDINGS

INTRODUCTION

This study found out that in UTH, Lusaka, nurses' number totalled 774 after the Voluntary Separation Package at the time of writing this report. The hospital actual work-force is 2656. The nurses' number makes up about 29.17% of the total UTH. work-force. The ratio of the rest of the health-care providers to nurses stands at 1 : 2. This shows that nurses form the majority in the institution's establishment. Therefore, the health-status of this very important resource should be well guarded.

This was a comparative descriptive study on nurses with the aim of identifying the contributing factors to the high prevalence of tuberculosis among nurses and designing strategies for their prevention. A number of factors were identified. Information was obtained concerning service, community factors and nurses knowledge on tuberculosis.

To supplement the information on the above, the researcher conducted a focus group discussion with nurses and a retrospective record review of 30 patients who were diagnosed with tuberculosis, treated and discharged from the medical unit.

The total sample size was 144. All interview schedules were filled and returned. All the nurses turned up for the FGD giving a response rate of 100%.

Focus Group Discussions showed that there is a need for the nurses to acquire orientations in the fields of hospital safety, patient care, and medical ethics. In the past 5 to 6 years, nurses have complained of a lack of research on the topic under study and are hopeful that more research be continued in this area.

5.1 Socio-Demographic Profile of nurse-respondents.

The total sample size was 144. Out of a total of 144 respondents, 107 (74.31%)) came from active reproductive age group. All of these were females except for 24 (16.66%) who were males. 65 (45.14%) of these were single. All of these had secondary level of education except one who had primary level of education. All had an income of not less than K110,000=00 and not more than K250,000=00 per month. All the nurses understand the implications of chronic cough with other signs and symptoms like night sweats etc as a suspicion of tuberculosis and probable HIV infection.

According to the work load and number of time hours, work load appears to be more than the salary they receive.

5.1.2 Age Distribution

(Table 7) shows the age-distribution of the study-participants. Their ages ranged between 20 -54 years. The mean age was 31.38 years. The youngest age was 21 years while the oldest age was 54 years. Of the total sample, 44 (30%) were aged between 25-29 years. This age-group formed the majority of the nurse-respondents. In this study 3 (33.33%) out of 9 participants aged between 40- 44 years have the highest incidence of tuberculosis. Table 10 shows that the

relationship between age and development of tuberculosis is of no statistical importance (P. Value. 0.07997633).

5.1.3 Gender and Marital Status

The study participants consisted of 24 males and 120 females from various hospital departments. Table 12 shows the influence of gender on tuberculosis. 15 (12.5%) out of 120 female nurses and 1 (4.16%) out of 24 male nurses were diagnosed with tuberculosis. There was no statistical significant relationship between these two variables (PV. 0.2356799)

When the effect of marital status on acquisition of tuberculosis was assessed, (Table 11) showed that 12 (12.3%) of 97 single nurses developed tuberculosis against 4 (8.5%) of 47 married nurses. This result was of no statistical importance. (P Value. 0.4894495).

47 (32.63%)) had monogamous marriage while 3(2.08%) had polygamous marriage, 11 (7.63%) were divorced, 14 (9.72%) are widowed and 6 (4.16%) are on separation.

(Matrix 1) shows that 63 (43.75%) participants were single and aged between 20-39 years. However, (DHS, 1996) put the age at which most women in Zambia get married at 18.6.years. This may be true of rural Zambia but professional women tend to get married much later. Single professional women may indulge in risky behaviour which increases morbidity and mortality among them. Information obtained from UTH. Administration showed that the age - range of dead nurses in UTH in 1996 was between 25-39 years of age, and that 54% of the deaths were among single nurses. This could be attributed to their indulgence in risky behaviour. A study conducted in UTH showed that 60% of 18 nurses who died between the ages of 25–39 had tuberculosis and AIDS related infection.

5.1.4 Economic status

The salary of all the nurses in the study ranged between K100,000 -K250,000. CBOH (1997) states that poor socio-economic status contributes to low immune status due to poor nutritional intake. A weakened immune status fails to control the latent tuberculosis infection in the lungs due to lack of food and re-current infections. This subsequently leads to the activation of the tuberculosis foci. This agrees with information obtained from the focus group discussion which showed that nurses feel they have low immune status because of poor nutrition. The immune status lowers further when they suffer from recurrent infections like malaria. In Zambia, malaria is an important cause of anaemia, specifically in pregnancy. This when compounded with tuberculosis forms a vicious circle.

5.1.5 Residence

In this study, three types of residences have been defined. These are:-

- Low-density areas are typified by residential areas like Munali and Kabulonga. These areas are associated with the opulent who lead healthy life-styles.
- Medium density areas are comprised of residential areas like Kabwata and New Chilenje. The people who live here lead acceptably healthy life styles. Most up and coming young families live here in their own self-built houses.
- High density areas are residences in areas like Mutendere and Kalingalinga. The houses are mostly overcrowded and unhealthy to live in. Residents here are of very low socio-economic status.

The study shows that the nurses earn almost same salary, therefore, the status of the spouses influences the residential area and thus the health status of the family.

Table 9 shows that 4 (12.3%) of 32 nurses who live in high density areas, 9 (11.5%) of 78 who live in medium density and 3 (8.8%) who live in low density developed tuberculosis. The study shows that there is no significance between these relationships (P Value.0.87938272).

5.1.6 Education and knowledge

Table 13 compared the effect of age with knowledge on tuberculosis transmission, prophylaxis and prevention on the acquisition of tuberculosis

The results show that 143 (99.3%) out of 144 participants attained secondary education while only one had primary education. Table 13 shows that only 1 (2.27%) out of 144 participants aged between 25-29 and 30-34 years who had excellent knowledge did not develop tuberculosis, while 21 (47.72%) and 12 (27.27%) of the-same age group had good knowledge. The results show that the younger nurses are generally more knowledgeable than the older ones.

Table 13 also shows that 6 (10.71%) out of 56 nurse-respondents who had good knowledge developed tuberculosis.

10 (12.5%) out of 80 who had fair knowledge also developed tuberculosis (Table 13).

However, none of the 6 (100%) out of 6 who had inadequate knowledge developed tuberculosis.

Negative responses were received from 120 (83.33%) out of 144 nurses when asked which patients were prone to multi-drug resistant tuberculosis. 81.25% answered negatively on the dangers of multi-drug resistant tuberculosis. It is important for nurses specifically in places like UTH to have a very clear cut knowledge of anti-tuberculosis therapy, dose, duration and

combination of drugs to be given during 2 months intensive therapy and thereafter for six or eight months whichever is recommended. The duration and administration of drugs will give them the knowledge of relapse, resistance or default.

Two nurses aged between 25-29, and 30-34 who had excellent knowledge did not develop tuberculosis; neither did their 6 counterparts who had inadequate knowledge.

This shows that the presence or absence of knowledge on tuberculosis did not pose any serious threats to the development of tuberculosis among the nurses. So there must be other factors not controlled in this study such as, HIV Status, which must have played a significant role.

Therefore, results show that there was no statistical significance between age and knowledge to the development of tuberculosis.(P Value 0.629166268) despite having the same basic education and professional training.

It appears that from this study knowledge and other socio-demographic variables of age, sex, marital status , residence and education did not seem to significantly affect the outcome of tuberculosis. The findings on knowledge and socio-economic status of the nurses hold true of the current situation regarding development of tuberculosis. This result shows the real tuberculosis situation currently existing which is contrary to a generally-held belief that tuberculosis is a disease of the down-trodden who live in over-crowded shanti-compounds. This study now shows that the unconventional tuberculosis can affect anyone regardless of age, sex, education and knowledge, residence and marital status. This finding supports the study conducted in South Africa by Schoeman et al (1991) in which they also found that the absence of socio-economic factors in tuberculosis disease process. However, a conclusion cannot be completely reached since the HIV status - a confounding factor was not investigated in the study.

The majority of the nurses attained secondary education with at least credit in Maths , English, Biology and other Sciences as the minimum entry into nurse-Training schools. This level of education enables the nurse to be self-directive in acquiring knowledge. This helps the nurse to develop an enquiring mind into the phenomena that exist in the clinical areas. These two qualities are prerequisites for acquiring experience and skill at the work-place. Stubbing (1998) quoting Benner P. (1984) who said that "experience based on skill acquisition is safer and quicker when it rests upon a sound educational base." Education leads to knowledge. Knowledge is power. Power derived from education influences factors like assertiveness - a much-needed quality in a heroic nurse of today. An assertive nurse would question when things go wrong. This would help to develop leadership qualities in nurses. Assertiveness would ensure proper training of nurses who would be ready to face the challenges brought about by the technological and scientific advancements in today's nursing world.

Therefore, it is of the utmost importance to increase the knowledge - base on tuberculosis among nurses. If the nurses' knowledge-base is increased, we are likely to decrease the tuberculosis prevalence in the hospital, individual, family and the community. So whatever preventive strategies adopted should involve the knowledgeable nurse as the change-agent both in the hospital and the community. The nurses should know the patient management and treatment modalities of tuberculosis patients and prompt the doctors for immediate action as soon as the patient is diagnosed as having smear positive pulmonary tuberculosis.

5.2 Ward environment

Mycobacterium Tuberculosis isolates from patients immediate environment

Table 16 tabulates some isolates grown from the sampling of patients immediate environment in randomly selected wards. Swabs taken from suction machine in Phase V. medical Admission ward was 3+AFB positive for microscopy. There was only one suction machine in this unit. Swab from a patient's pillow in ward EO2 side ward, where there were 3 patients with 3 pillows, was 2 AFB positive while swab from a patient's locker in E11 side ward with 3 patient’s lockers, was 3 AFB positive for microscopy.

Table 17 shows that atypical TB bacilli was grown from cultured specimen taken from Suction Tubing on Baby's Resuscitation Machine in the Labour Ward.

Other organisms were grown from various equipment and environment in other critical areas in the hospital. These are reflected in table 17. These infections can take epidemic proportions if infection prevention recommendations are not carried out, this is important for the reduction of nosocomial infections between patients and nurses.

Ward facilities required for maintenance of ward basic hygiene in-order to reduce nosocomial transmissions between patients, nurses and patients and vice -versa, also were observed and recorded.

The results are Tabulated in tables 16b and 16c.

Sterilisation

12 (31.58%) out of 38 wards receive adequate sterilised packs for carrying out sterile procedures. High level disinfection processes are in use when wards experience shortages . Nurses knowledge in this area needs updating. There was inadequate sputum disposal facilities in 35 (92.11%) out of 38 wards visited. 37 (97.3%) out of 38 wards did not have adequate face masks. This reflect poor infection prevention measures and poor sanitary standards in the hospital. It is not worthy that mycobacterium tuberculosis should be isolated from suction tubing used for baby resuscitation in the delivery rooms and phase V medical admission.

Gloves

Glove-supply was adequate in 30 (78.95%) out of 38 wards visited.

It was noted that gloves were worn mostly while carrying out wet procedures like changing unconscious patients and while suctioning patients. Generally there was glove-change after such patient-contact. Nurses wore same gloves while bed-making and while carrying out other dry procedures. Reasons are that it is not cost -effective to change gloves after each patient - contact.

Types of taps

Depressible taps were found in 25 (65.79%) of 38 wards visited. Taps with twist-tops were found in 12 (31.58%) out of 38 wards visited.

Elbow - operated taps, which are the ideal type of taps required in clinical areas, were found in only one ward while a mixture of all three types were found in two wards.

Soap-supply

There was irregular supply of soap in 37 (97.37%) of 38 wards visited. Only one unit had regular soap-supply.

Isolation facilities are inadequate in UTH. At the time UTH was constructed the incidence of prevalence of tuberculosis was at a low level. According to HICC, patients suffering from infectious diseases should be kept at side wards. All the wards in the hospital have side ward facilities. As has been mentioned earlier, there is a dramatic rise of tuberculosis in Zambia. Major admissions in the hospital and health institutions are due to tuberculosis which are HIV related. As a result of this, the UTH management board has got no option but to keep these patients in the beds other than the side-wards. Of late, patients admitted in the hospital are suffering from multiple infections like tuberculosis, HIV infection, Sexually Transmitted Infections (STI) and other skin infections on every third or fourth bed in the hospital. These are serious situations and often kept the nursing staff and the UTH authorities busy seeking solutions to these problems. This seriously reflects the inadequacy of budgetary allocations in the hospital. Emphasis should be given to provide facilities for the safety of the nurses.

This situation arises as a result of a depleted infrastructure in the hospital. In addition, the constituted Hospital infection Control Committee is almost non-existent. Compromising nursing care and ignoring Infection prevention and control measures and isolation procedures due to inadequate and irregular provision of medical and nursing care items required to maintain basic hygiene in the clinical areas becomes the order of the day. This situation becomes totally unacceptable and unsafe. Sputum-positive tuberculosis patients are nursed together with non-tuberculosis patients especially HIV patients. Blumberg H.M. et- al (1997) documented similar

experiences in USA where patients who were not suspected tuberculosis patients were nursed together with HIV patients. The authors continued to say that because they were immunocompromised, delayed diagnosis were common in these patients because of atypical presentations, even in chest X-ray findings and low clinical suspicion which led to misdiagnosis and failure to isolate patients with active tuberculosis. This coincides with the finding in this study as illustrated in table 30 where delayed diagnosis. Rates of transmission of mycobacterium tuberculosis between patients and nurses increases in this scenario.

Guidelines

These were present in 34 (89.47%) out of 38 wards visited.

These are required to guide the practice of nurses in the wards but it was obvious they were not being followed. Ward records showed there was no clinical audit being carried out periodically.

Working and Duration of stay in medical and surgical wards.

When the relationship between working in medical and surgical wards on acquiring tuberculosis among nurse- participants were assessed, Table 14 showed that 13(16.25%) of 80 nurses who worked in the medical ward, and 3(4.7%) out of 64 surgical nurses, developed tuberculosis. This result proved to be statistically significant (P. Value 0.02822476).

Working and duration of stay in Medical Ward

Table 15 shows that there was significant relationship (P.Value 0.0011098) between exposure based on duration of stay in a medical ward and the development of tuberculosis among the nurses who took part in the study.

This study proved that nurses who worked for more than two years in medical wards and therefore had prolonged contact, were diagnosed with tuberculosis, much more than nurses who had less contact-years with tuberculosis patients. However it should be noted that nurses exposure to tuberculosis is three-fold. First of all, nurses come in contact with tuberculosis patients during admission and also while screening in the outpatients department. Secondly, nearly half of the nurses have had contact with tuberculosis in their families, this is one of the important outcome of this study. Lastly, one cannot forget the relation of tuberculosis with HIV infection. This is the major cause of tuberculosis not only in UTH and Zambia, but also in any part of the world where there is existence of HIV infection. Incidentally, this study did not look at the sero status of the nurses. If it was done, then it would have definitely reflected on the results of the 1998 sentinel surveillance data which had shown every third woman to be sero positive. The prevalence of tuberculosis among nurses is not entirely the fault of depleting infrastructure of UTH but also because some of the infected nurses could have acquired it from their families and their geo-location, and some of these would be sero-positive which is a missing link in this study.

The study further compared the effect of day and night shifts on the development of tuberculosis. The study, showed that working either day or night shifts does not seem to be the problem in

acquiring tuberculosis. However, (Table 27) revealed that working in a medical ward for long duration especially on night shifts when the doors and windows are shut and in the absence of any mechanical ventilation does suggest a concept of sustained contact and exposure, as being the real issue in the development of tuberculosis among nurses (P.Value 0.03493938).

The study further explored the effect of exposure to the Tuberculosis bacilli in the community alone as well as in combination with clinical exposure and contact.

In this study, Double contact is defined as where a nurse has a tuberculosis contact and exposure in the community as well as having experienced long exposure periods in medical wards. Single contact is defined as where a nurse has either of the above contacts and exposure.

Table 18 assessed the risk faced by nurses with single contact showed that 9 (13.2%) of 68 participants with single contact and 7 (9.21%) out of 76 nurses without single contact developed tuberculosis. This was a statistically significant relationship (P.Value 0.04429524). Table 19 showed a greater statistical significance with a (P.Value 0.0107868) when the nurses actually stayed with the patients.

Double contact also had a statistically significant relationship among nurses with and those without, (P.Value 0.0000048).

Whereas prolonged contact and exposure with a family history of tuberculosis with at least one contact did affect the development of tuberculosis, it appears that having tuberculosis patients living within 10 houses of the nurses' residence did not significantly affect the outcome of tuberculosis. This could be because there may not have been close contact. This finding agrees

with the view expressed by Stead W.W.(1995) which said that the greater the exposure , the greater the chances for developing clinical tuberculosis.

5.3 Protection of nurses

Since this study intended to design strategies for protection of nurses from developing tuberculosis, it looked at whether BCG can protect nurses.

In this study, 128 (88.88%) had childhood BCG; 6 (4.68%) of these 128 nurses developed tuberculosis.

16 (11.11%) out of 144 nurses had Booster BCG during their nurse-Training; 10 (62.5%) out of these 16 nurses also developed tuberculosis.

Therefore, Table 25 shows that 10 (62.5%) out of 16 nurses who had both childhood and adulthood BCG vaccinations and 6 (37.5%) out of 128 who had childhood BCG all developed tuberculosis.

Therefore, it can conclusively be said that this study has demonstrated that the administration of BCG vaccination does not guarantee protection against developing tuberculosis among nurses. This finding is of statistical significant(P.Value 0.04238011). In the past there was practice of giving BCG to nurses on entry into nurse training schools. This study has found out that some nurses were given BCG on entry into nurse training schools. Ten 10 (62.5%) out of 16 nurses received extra dose of BCG as a protective measure on entry into nurse training school during their adult life. These developed and suffered from tuberculosis proving that BCG did not have any protective effect on them. Studies conducted by Chintu et al (1993) have also found inefficacy of BCG among children and have recommended a re-investigation on the use of BCG specifically among children where instead of protecting them from tuberculosis, it produced

disseminated tuberculosis. This finding agrees with the findings of Baboo (1999) and Chintu et al (1980), Waddel et al (1997), Villarino E.M. et al (1996) and Menzies D et al (1995) and Zurlo J.J.(1996) all of who have doubted the efficacy of BCG vaccination. All these studies have proved the inefficacy of BCG

5.3.1 Early identification of tuberculosis infection by conducting Tuberculin Skin Testing

Pure Protein Derivative was used in carrying out Tuberculin Skin Test (TST) among all the nurses in the study in order to measure their level of exposure to tuberculosis bacilli. This would diagnose whether or not they have latent tuberculosis. Grimes et al (1997) stated that TST readings greater than 5mm (>5mm) may be regarded as positive reading for the following persons.

- Known or suspected HIV infected people
- People with close contact with known tuberculosis patients.
- Those who have chest x-ray readings suggestive of previous tuberculosis.

In this study, table 23 shows 36 nurses had readings of 5-10mm. If the nurses had their HIV status established, those, TST results would have been interpreted as positive for HIV positive nurses and negative for the HIV negative nurses definitely.

The authors also stated that TST reading of >10mm is positive for persons at high risk of tuberculosis, with other risk and medical conditions known to increase the risk of tuberculosis infections. In this study 42 nurses fell in this group. 07(4.86%) had TST result of 20-40mm. Grimes et al guidelines have suggested to regard results ">15mm as positive for all others". All the nurses with readings from 10-40mm show that they have latent tuberculosis and should have

mandatory sputum smear tests and chest x-rays done in order to confirm or refute the diagnosis of tuberculosis even if they are HIV negative.

Table 24 showed that 6 (6.31%) out of 95 nurses who had <10 mm developed tuberculosis while 10 (20.40%) out of 49 nurses with >10mm TST results also developed tuberculosis.

This finding demonstrated statistical relationship thus indicating that the level of exposure does determine the outcome of tuberculosis (P.Value 0.0107868). The result of the positive TST results may not necessarily mean that the nurse has active tuberculosis; it may just be dormant tuberculosis which is said to be protective. On the other hand negative TST results may not necessarily mean that the person does not have active tuberculosis as Gordon 1997 has stated that TST is only available to diagnose latent tuberculosis infection. The author also cautioned that TST has low sensitivity in HIV infected persons because of high rate of anergy in HIV infected persons due to their low immune status. It is only pertinent to mention that all the 144 subjects did not give any evidence of tuberculosis when their sputum were examined under the microscope. They were all negative for Acid Fast Bacilli except for one nurse where only 1 mycobacterium tuberculosis was seen out of 3 sputum samples. TST results and x-ray findings are suggestive of tuberculosis but not confirmatory.

Table 24 identified 10 nurses with >10mm TST and 6 with <10mm TST whose chest x-rays were suggestive of pulmonary tuberculosis and who had sputum smear negative test results. These were referred to chest x-ray for further investigations, where the researcher was informed that those nurses were treated with anti-tuberculosis drugs for a duration which is not known. But on interrogation, it was revealed that they had successfully completed their treatment. Results of follow-up sputum test could not be traced. These results could have confirmed

whether they were free of mycobacterium tuberculosis. This is the major problem as far as the treatment of tuberculosis is concerned. The Researcher does not know if they defaulted , or are carriers of resistant strains of mycobacterium tuberculosis. In-order to confirm these questions or suspicions, a detailed investigation is necessary so one can focus at the exact nature of the tuberculosis among the nurses.

It can then be said that the TST results depend on the immune status of the nurse. The nurses who had negative TST results, like other nurses, are in daily contact with tuberculosis patients. These nurses could be low immune status from a variety of causes. Therefore this study concurs with Grimes et al (1997).

From all the above analysis, it can be seen that all the objectives have been met, all hypothesis supported and the research questions answered. Hence the study now elaborates on the implications of the study.

5.4 Implications of the study

This study has shown some areas of deficiency in the clinical environment and health-service delivery in the hospital. Therefore, the UTH. Board of Management needs to put some institution-specific guidelines in-order to rectify the identified deficiencies.

The findings show that a combination of clinical and community factors contribute to the prevalence of tuberculosis among nurses who become prone to acquiring tuberculosis from two sources:-

5.4.1 The patients

Table 29 in the retrospective case study showed that 4 (80%) out of 5 tuberculosis patients who defaulted had a relapse. These might have had multi-drug-resistant tuberculosis. These patients can infect other nurses with this strain of tuberculosis which is easily transmissible and difficult to treat. This revelation implies the strengthening of the capacity of the health care delivery system to identify multi-drug-resistant strains of mycobacterium tuberculosis in patients with tuberculosis relapse.

The study also showed that the:-

5.4.2 General ward environment

The study also demonstrated that the ward environment is another source of infection for the nurse going by the

- isolation of mycobacterium bacilli in patient's immediate environment like the pillow, and the locker (Table 16).
- Table 17 shows isolation of tuberculosis bacilli in nursing-care equipment like the suction tubing.
- Prolonged and sustained man-hour contact as occurs in night shifts. (Table 27)
- Exposure to tuberculosis bacilli by having a family history of tuberculosis with at least one contact and also having tuberculosis patients within the geo-location (Table 21).

These findings agree with Babus V.(1997) when he said that health-care providers were regularly exposed to mycobacterium tuberculosis whilst working in medical wards. This exposure theory

was further proven when the risk factor of exposure in medical wards were assessed. There are occasions, when UTH is over-crowded, specifically on Unit-admission days and visiting hours in the morning and evening. Over-crowding could be one major contributing factor which precipitate on sanitary conditions. There also appear to be shortage of bed space in the clinical areas. During the study it was observed that the space between beds has diminished from 3metres to less than a metre between beds. This implies that the UTH management board would, perhaps, like to focus on reducing over-crowding during their re-organisation schemes. It is an established fact that over crowding decreases ventilation and increases risk of tuberculosis both among the attending nursing staff, non tuberculosis admitted patients and the visitors. Together they form a vicious cycle of infection. This can only be reduced by proper administrative policy of the hospital like strengthening of the HICC whose main objective is to maintain basic hygiene practices in the hospital.

5.4.2.1 Service factors

Knowledge on Infection prevention practices should be introduced early enough during both block and clinical experiences in the Basic Nursing Curriculum.

This would ensure that learned principles, put into good practices in the clinical areas are internalised by the students early in their professional career.

The study demonstrated that nurses have inadequate knowledge on aspects of multi-drug resistant tuberculosis.

The implication here is that any primary preventive measures that the policy-makers hope to introduce should focus on giving instructions on tuberculosis in-order to remove all

misconceptions on the subject. This can be done at the In-Service Education Department at the UTH.

- Protection of nurses

The result on the BCG implies that policy-makers should design other primary preventive strategies other than using BCG in preventing and controlling the prevalence of tuberculosis among nurses. These primary preventive strategies should focus on good nursing practices to avoid cross-infection between nurses and their patients and vice-versa. This implies the introduction of auditing of standards of care in the hospital.

- Early identification of tuberculosis

From table 23, this study implies that TST can be used to identify nurses who need to undergo thorough examinations for active tuberculosis periodically, and to institute early treatment if necessary. It also implies that there is an urgent need for counselling nurses to opt for Voluntary Counselling and Testing which may lead to establishment of nurses HIV status. This would facilitate proper interpretation of TST results as shown in table 23.

The TST results have an implication that further studies are indicated in order to assess the immune status of the nurses with negative TST results.

5.4.2.2 Night shifts

The study also showed that nurses do seven days night shift on a stretch. The number of hours of each night shift is about 14 hours.

This gives a total of 98 hour/week, and 196 hours/month in cases where nurses do night shifts twice a month. This contravenes the International Council of Nurses (ICN) recommendations of a 40 hour /week.

Long man-hours lead to burn-out syndrome which incapacitates the nurse from taking adequate precautionary measures while rendering care. The implication of this study on this is for the policy-makers to look at the possibilities of shortening the night-shift in terms of hours per night or days per week in-order to conform to the ICN standards. This would aim at reducing the time that nurses spend on congested wards, full of patients, many of whom may be suffering from HIV-related tuberculosis. This study has already mentioned the possibility of shortage of bed space in the hospital. It also appears that man hours of nurses can be reduced and thereby the exposure of tuberculosis in the hospital. For this to happen, UTH Board of Management would require to increase the number of nurses.

5.4.2.3 Isolation Facilities

There is the need to have a regular provision of nursing care items required to institute stringent isolation procedures while nursing patients with smear-positive tuberculosis. This will empower the nurse to protect themselves and the patients while rendering care.

CHAPTER 6

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The study noted the following;

- The current tuberculosis can affect anyone regardless of their knowledge and socio-economic status as illustrated in Tables 9, 10, 11 and 13.
- That nurses understand the implications of cough as a suspicion for tuberculosis and probable HIV infection and disease. This came out vividly during focus group discussions.
- The study showed that nurses who worked in medical wards were more pre-disposed to acquiring tuberculosis than nurses who worked in surgical wards. (P.V. 0.02822476). The risks are higher for those nurses who worked for more than one year because of prolonged contact with patients suffering from tuberculosis especially if they have been doing a lot of night shifts due to shortage of staff (Table 28).
- The theory of prolonged contact and exposure was seen to affect the outcome of tuberculosis among nurses in the community rather than having family history of tuberculosis with no contact or having patients living within ten houses of their geo-location (Tables 18 & 19).
- From Table 16b and 16c , show that the hospital should have a regular and adequate supply of most hospital facilities and nursing care items required to maintain basic hygiene practices.
- This study also show that BCG cannot guarantee protection to nurses from acquiring tuberculosis (Table 25).

- Information from the focus group discussion showed that nurses feel very strongly that effecting primary preventive measures in the wards are much more important than ward rotation as one can be rotated from one high risk area to another.
- One of the striking factors observed during this study is the isolation of the mycobacterium in patient's immediate environment like the pillow and locker, existence of overcrowding during admission days and visiting hours.
- Most of the mechanical ventilation system (air-condition) in almost all the wards are not working as a result of which ventilation during admissions and visiting hours is very poor and also during nights the windows and doors are closed.
- All the above appear to be factors which strongly affect the outcome of tuberculosis among nurses and they seem to be inter-related.

Therefore the factors that have been found to contribute to nurses acquiring tuberculosis are multi-factorial:

Community factors

- Tuberculosis patients living within 10 houses of nurses' homes.
- Having a family history of tuberculosis.
- Staying with patients suffering from tuberculosis.

Service factors

- Sustained contact and exposure with infected patients in medical wards during both day and night shifts.

- Inadequate maintenance of basic hygiene practices.

These factors seem to synergistically contribute to nurses developing tuberculosis both from the community and the health-care work-place. It was noted though, that sometimes when the factors are analysed singly, they seem not to affect the outcome of tuberculosis. It is for this reason that strategies aiming at preventing and controlling tuberculosis should be multifaceted.

6.2 RECOMMENDATIONS

There is the need to develop a healthy work-force especially the nurses since they form the majority of the work-force in the hospital.

Therefore, the following recommendations are being made for the hospital and the DHMT.

The Hospital

There is need to revisit the hospital engineering controls. In 1964, at the time when UTH was built, the population was 350,000 for the city of Lusaka and the overall population of the country was 5 million. UTH being a referral hospital is supposed to cater for the needs of only those patients who require referrals. However, the population is one factor which has gone out of control. The current population for the city of Lusaka is 2.2 million and that of Zambia is about 11 million. Together, these have compounded to the miseries of not only UTH but also of admitted patients and also the staff who are looking after them. The current structure of the UTH requires a complete renovation and facilities such that the care givers are protected while rendering care and the recipients of care are satisfied. This can only be possible by re-organising the hospital engineering system, architecture and stipulated administrative policies which we have in reducing over-crowding and improving the ventilation in the clinical areas and hospital facilities within the hospital grounds.

Clinical Areas

- The Hospital management should come up with a clear policy for the management of Tuberculosis patients in UTH
- In-order to start the isolation process, a female ward for smear-positive tuberculosis

patients can be created for women, leaving the other two wards for other female patients with varied diseases.

This can also be done for the male patients. This move is possible because each ward can cater for up to 70-80 patients. While the voluntary separation package has necessitated the merging of wards due to staff-shortage , this is just a fine time to undertake this move.

- The HICC should conduct routine ward-surveillance followed by thorough environmental cleaning in-order to rid the ward environment of mycobacterium tuberculosis. This should be sustained by supervised daily cleaning with hypochlorite solution. This would also mean increasing the ward allocation for disinfectants - hypochlorite solution specifically.
- During focus group discussions, nurses expressed the wish that they would love to see more research of this nature carried out in the hospital. Therefore the hospital management should endeavor to set up an Infection prevention Secretariat with a team of nurse-researchers and headed by the Infection Prevention and Control Nurse. The Policy-makers should set up a Research Fund for clinical research into problems existing in our clinical areas followed by dissemination of findings. The body of knowledge from the study should be injected into practice, in this way, the hospital would have a research-based practice.

Personnel

- Preventive therapy modalities for the nurses who will be working in these wards can be worked out. This is actually not an innovation in Zambia since nurses who used to work in Kabwe used to be put on Isoniazid preventive therapy.

Further studies are implied in this area in-order to make it research-based.

- The Management may consider the possibility of starting a Medical Insurance Scheme. This would empower the nurses to seek early medical attention during periods of own illness.
- Periodical chest x-ray / medical exams should be made mandatory and enforced by the unit managers on a half-yearly or yearly basis.
It would be great idea to build a sick-bay for nurses requiring admission when sick.
- A meal can be supplied to the night staff from the hospital canteen at subsidized cost. This would help to shorten the period when they stay without food since our night shifts are quite long. This would also help to boost their immune status.
- Counselling sessions to be set up for nurses to enable them to talk through their fears, calm them and dismiss all mis-informations and misconceptions.
- The Management may look into the welfare of nurses as stipulated under the recommendations. Implementing these implications would show that the Management shows some concern for its heroes and heroines - the back-bone of its work-force.

Tuberculosis-update to increase the knowledge-base of nurses on Tuberculosis

- The study showed that nurses have inadequate knowledge on what constitutes multi-drug-resistant tuberculosis. Nurses should receive instructions on the latest developments on tuberculosis this could be done through conducting -
- Workshops, seminars and conferences and informal instructions and FGDs at the In-Service Education Department and through the collaboration and co-ordination of the

national media

- The clinics are not well equipped to render holistic care to their patients in terms of early identification and treatment. It is recommended that the DHMT equips the local clinics to render quality health-care.

Recommendations for the District Health Management Team (DHMT)

- **The DHMT** in conjunction with the Ministry Of Health and the Central Board of Health are to equip the local clinics with all the logistics required to facilitate early identification, diagnosis and treatment of patients with tuberculosis. This can be achieved by ensuring that a vertical structure with qualified and experienced tuberculosis specialists exist at all levels of the health-care delivery. The tuberculosis specialist would ensure that the health-center adheres strictly to the DOTS Regime in the community. They will also ensure that the health-centre staff conducts targetted health-education messages to the patients with tuberculosis in the community.

The Emphasis of this Study

There are two major emphasis which this study has identified.

- Paucity of knowledge of tuberculosis and its management among nurses.
- Depleted infrastructure of UTH.

These two are major contributory factors which increase the risk of exposure among the nurses and those patients who come for treatment other than tuberculosis.

1. **Final Proposition of this study**

- Implementation of policies regarding sputum testing
- Use of appropriate ATT regimen
- Duration of treatment
- Availability of drugs.

There is need for both doctors and nurses to follow these steps in patient management in order to reduce the risk of infection transmission to other patients and to health care givers.

Step I

In cases of relapse find out the following;

- Patient's medication (ATT)
- Doses
- Duration
- Whether supervised or not

All these facts can be obtained from patient's clinical records. All these would show whether the patient defaulted or collection of drugs was irregular.

Step II

The health care givers should ask the patients the following questions;

- Did you take all medicines
- Did you miss days or weeks or months

Then confirm patient's response with a close relative(s).

Step III

- Consider the possibility of HIV infection because relapse in HIV patients is very common. In such cases patients need counselling.
- Send sputum for microscopy and culture

2. Revisiting of UTH

- Revisit UTH administrative and engineering controls. This would ensure improvement of infection prevention and control measures within the hospital.

It should be noted that neither the time nor the tide awaits for anybody.

Therefore:- **“Timely interventions are sustainable and untimely interventions are disastrous” (KSB)**

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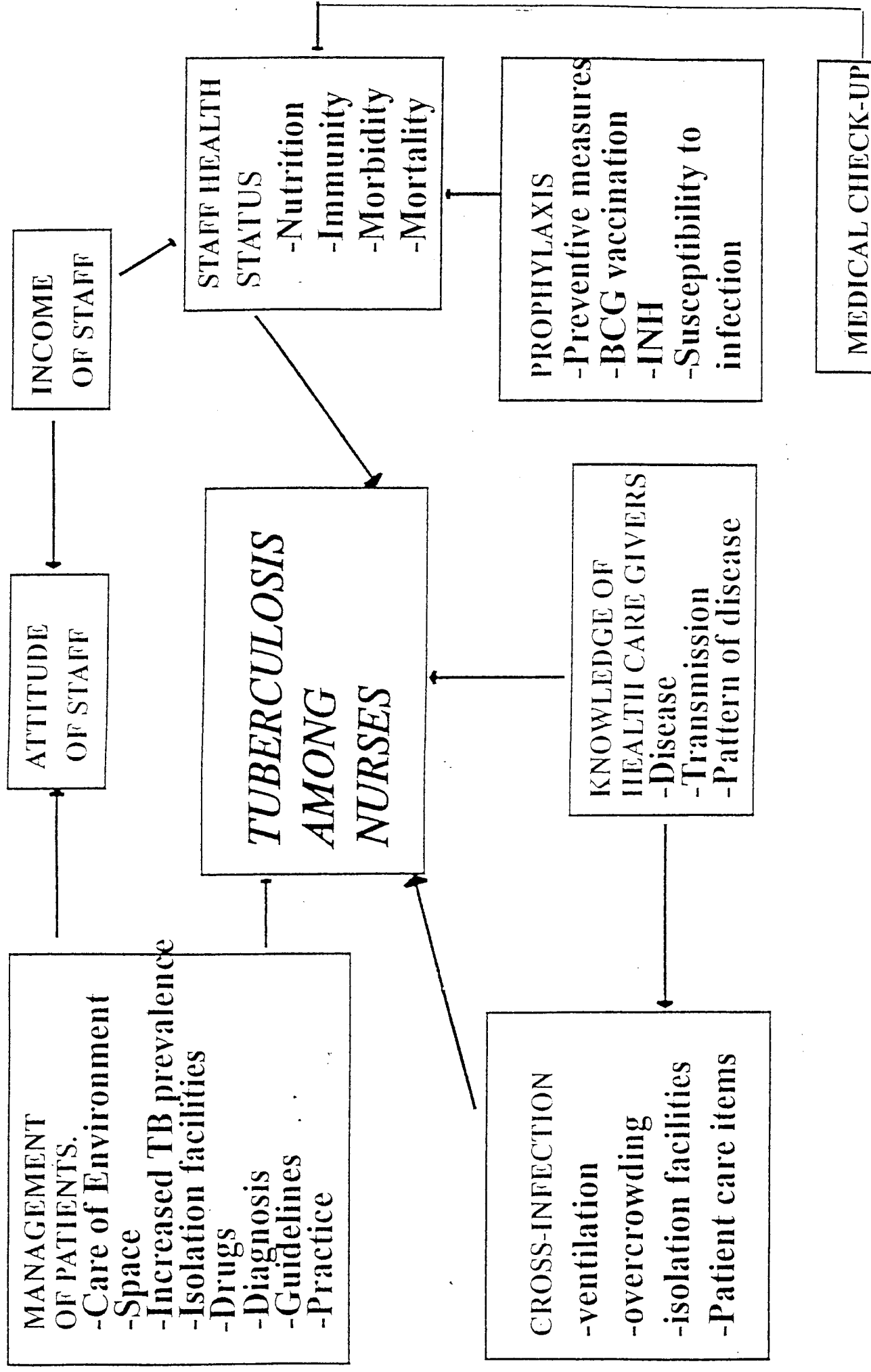
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UNPUBLISHED INFORMATION

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CONCEPTUAL FRAMEWORK



University of Zambia
School of Medicine
Department of Community Medicine
P. O. Box 50110
LUSAKA

26 February 1999

The Director
Lusaka Urban District Health Management Team
P. O. Box 37136
LUSAKA

ATTENTION : TB SPECIALIST

Dear Madam

RESEARCH ON "TUBERCULOSIS AMONG
HEALTH-CARE WORKERS"

I am an MPhil student conducting the above research in Lusaka Urban District
Management Team health centres.

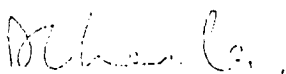
Your assistance is required in providing me with a list of health-care workers who are:

- Suffering from TB and are on treatment
- Have been treated from TB and cured
- Who have died from TB

These include the nurses, clinical officers, and maids.

Thanking you for your help.

Yours faithfully



Dorothy Chanda (Mrs.)

Handwritten notes and signature:
Listed
The Director
Lusaka Urban District Health Management Team
P. O. Box 37136
LUSAKA
26 Feb 1999
Dorothy Chanda

Dorothy Chanda
School of Medicine
Dept. of Community Medicine
P.O. Box 50110
LUSAKA

2nd March, 1999

The Managing Director
UTH Board of Management
P/B RW 1X
LUSAKA

u.f.s. The Head of Dept.
Community Medicine
School of Medicine
P.O. Box 50110
LUSAKA

HEAD COMMUNITY MEDICINE
SCHOOL OF MEDICINE
UNIVERSITY OF ZAMBIA
P.O. BOX 50110, LUSAKA.

John
3.3.99

Dear Madam

**Re: STUDY ON OCCUPATIONAL EXPOSURE OF HEALTH PERSONNEL TO
NOSOCOMIAL TUBERCULOSIS**

I am an MPH student carrying-out a study on the above topic.

Please, may I request for permission to have access to data on tuberculosis from the Health Systems Information Department.

Thanking you for your co-operation.

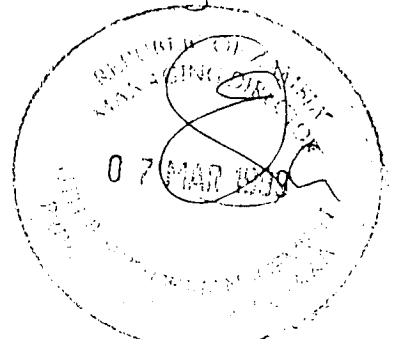
Yours sincerely

Dorothy

DOROTHY CHANDA

07/03

Permission
granted



Mr Ngobu
Can you please assist her.
Mwale

The MPA Co-ordinator
The University of Zambia
School of Medicine
Dean's Office
P.O. Box 50110
Lusaka


Dear Sir,

RE: REQUEST TO CARRY OUT STUDY - MS. D. CHANDA

I refer to your letter dated 08/01/2000 in respect of the above mentioned subject. This office has no objections for Mrs Chanda to carry out study on "The contributing Factors to the high Prevalence on Tuberculosis Among Nurses in U.T.H. Lusaka."

We wish her all the best in endeavours.

Yours faithfully,



A. Malewa

Cc Director of Nursing.

OBSERVATION CHECK LIST

Check list in clinical areas

1.

Number of patients seen in the ward
2.

Bed space
3.

Total number of staff

Doctors

Nurses
4.

Gloves

1.

Adequate

2.

Inadequate

3.

Not available
5.

Face masks

1.

Adequate

2.

Inadequate

3.

Not available
6.

Number of wash basins
7.

Type of tap

1.

Elbow operated tap

2.

Twist

3.

Deepers
8.

Thorough ventilation

1.

Adequate ventilation

2.

Inadequate ventilation
9.

Isolation Facilities

1.

Adequate

-

Separate cubicle

-

Separate crockery

-

Use of gloves, procedure, changed after more than I patient

-

Use of plastic aprons

-

Washing of hands before and after each patient contact.

- Use of covered sputum mugs.
- Disposal method of sputum mugs.
- Environmental cleanliness.
- Restriction into tuberculosis unit or cubicle.

2. Inadequate

- Absence of any of the above.
- State areas of inadequacy.

.....

.....

Disposal of sputum mug if any – State how?

Sterilisation

--	--

1. Adequate
2. Inadequate

10. Availability of soap

--	--

1. Continuous supply of soap
2. Irregular supply of soap

11. Mode of hand drying

--	--

1. Paper towel
2. Cloth towel
3. Others – specify

12. If cloth is used for hand drying state how many are in the ward. How often do the nurses change them?

.....

13. Suction machine.

--	--

1. Only available in the ward
2. None availability. Borrows from next ward.

13. Presence of guidelines to guide nurses practice.

14. Write down organism isolated from suction machine.

FOCUS GROUP DISCUSSION FOR NURSES

INSTRUCTIONS

1. Welcome the participants
2. Introduce yourself and your recorder to the Group
3. Ask participants to introduce themselves in order to "Break the Ice".
4. Assure participants of confidentiality of information and encourage them to feel free to express themselves freely.

TOPICS FOR DISCUSSION

1. Nurses' Knowledge regarding tuberculosis on:
 - transmission
 - prophylaxis
 - protection
2. Nurses feelings regarding prevalence of tuberculosis among nurses
3. Suggestions on how to prevent transmission
 - effect protection and
 - start tuberculosis prophylaxis

INSTRUCTIONS FOR RECORD REVIEW

1. Number records from 1 – 30.
2. Make a table with these headings;
 - (i) Date of first contact with the institution.
 - (ii) Date of admission.
 - (iii) Date when patient was seen by the doctor.
 - (iv) Work out number of days when patient was seen by a doctor. Write it down.
 - (v) Date that investigations were ordered.
 - (vi) Date of receipt of results.
 - (vii) Work out time lapse.
 - (viii) Result of investigations – diagnosis.
 - (ix) Date when patient was commenced on treatment.
 - (x) Time between admission and commencement of treatment.
 - (xi) Work out exposure periods.
 - (xii) State response to treatment: Reactions
No reactions

SELF ADMINISTERED INTERVIEW SCHEDULE ON THE CONTRIBUTING FACTORS TO THE HIGH PREVALENCE OF TUBERCULOSIS AMONG NURSES IN UNIVERSITY TEACHING HOSPITAL, LUSAKA

IDENTIFICATION

Name of Interviewer: _____

Date of Interview: _____

Type of Respondent: _____

Serial Number:

--

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INSTRUCTIONS TO INTERVIEWER

- Introduce yourself
- Introduce purpose of study
- Get consent for the interview
- Ensure confidentiality
- Thank Respondent after interview
- All Nurse respondents to have Tuberculin Skin Test done and sputum Smear test and chest X-ray test done (Pregnant nurses are exempted from chest X-ray and TST)

BACKGROUND/DEMOGRAPHY DATA

1. Date of Birth:

--

--

--

2. Age:.....

--

--

3. Residential Address:

--

--

- 1. High density
- 2. Medium density
- 3. Low density

4. Religion: _____

--

--

- 1. Pentecostal
- 2. Roman Catholic
- 3. Others (specify)

5. Educational level: _____

1. Primary
2. Secondary
3. University

6. Marital status: _____

1. Single
2. Married (monogamous)
3. Married (polygamous)
4. Divorced
5. Widowed
6. Separated

7. How many children have you had?

1. 1-3 children
2. 4-6 children
3. None

Number of living children:

Number of dead children:

8. State your salary:

1. Under K100,000
2. K100,00 – K250,000
3. Over K250,000

SERVICE FACTORS

9. How long have you worked in UTH? _____

1. 1-2 years
2. 3-8 years
3. 9-14 years
4. 15-20 years
5. Over 20 years

10. Which ward have you worked the longest? _____

--	--

1. Medical
2. Paediatrics
3. Surgical/ICU
4. Chest clinic
5. Clinics
6. Obstetrics and gynaecology
7. Operating theatre

11. State the length of period you stayed in the ward _____

--	--

1. Under one (1) year
2. One (1) year to three (3) years
3. Over 3 years

12. Were you healthy when you worked in this ward?

--	--

1. Yes
2. No

13. If "No", state what illness you are suffering from now or have suffered from.

1. Sore throats, coughs and colds
2. Malaria
3. Tuberculosis
4. Hypertension
5. Loss of weight
6. Skin rashes

14. How often did you do night shifts per month in this ward?

--	--

1. Once a month
2. Twice a month

15. How many hours is your night shift?

--	--

1. Less than 12 hours
2. 12 hours or more

16. Do you have a proper meal when on nights?

--	--

1. Yes
2. No

17. How many hours is your day shift?

1. 6 hours
2. More than 6 hours

18. How many hours work do you do in a week?

1. Less than 40 hours
2. More than 40 hours

KNOWLEDGE QUESTIONS ABOUT TUBERCULOSIS

19. How does one get tuberculosis?

1. By breathing in air with tuberculosis germs
2. By eating the tuberculosis germs accidentally
3. Through mucus membrane

20. Do you know how you can protect yourself as a nurse from getting tuberculosis?

1. BCG vaccination
2. Taking isoniazid tablets on doctor's orders
3. Washing hands after each patient contact
4. By wearing masks whilst nursing a patient with active tuberculosis

21. Do you know the functions of face masks in tuberculosis prevention?
State your answer.

22. Do you know there is tuberculosis prophylaxis?

1. Yes
2. No

if "Yes" write down the answer.

23. Do you know how the prevalence of tuberculosis can be controlled?

1. By good nutrition
2. By ensuring that nurses go through pre-employment medical exams
3. Early detection of nurses with active tuberculosis
4. By doing tuberculosis skin test using pure protein derivatine (PPD) and by using Isoniazid
5. Chest X-ray
6. Using Isoniazid prophylaxis
7. By living good environment
8. By working in a spacious, well ventilated clinical setting
9. By isolation

24. What do you understand by multi-drug resistant tuberculosis? Write down your answer.

25. Which patients are more likely to get multi-drug resistant tuberculosis? State your answer.

26. Do you know the dangers of multi-drug resistant tuberculosis? State your answer.

27. Which of these services does your hospital provide to prevent nurses from getting tuberculosis?

- 1. Yearly medical exams
- 2. BCG vaccination
- 3. Tuberculin skin test
- 4. Chest X-ray
- 5. Isoniazid prophylaxis
- 6. None of the above

When last did you have BCG vaccination?

- As a child?

--	--

- 1. Yes
- 2. No

If "No", state date of last BCG vaccination _____

UMBRELLA SURVEILLANCE

28. Is there any past history of tuberculosis in your immediate family?

--	--

- 1. Yes
- 2. No

If "Yes", who?

- 1. Husband
- 2. Wife
- 3. Son/step son/brother
- 4. Daughter/step daughter
- 5. Uncle
- 6. Aunt/sister/brother
- 7. Neighbours
- 8. Nephew/niece/cousin
- 9. Not applicable

29. Have you stayed with anyone who has or is suffering from tuberculosis?

--	--

- 1. Yes
- 2. No

If "Yes", state how long.

- 1. Less than a year
- 2. More than a year



THE UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE

DEPARTMENT OF COMMUNITY MEDICINE

Telephone: 252641
Telegram: UNZA, Lusaka
Telex: UNZALU ZA 44370

Dean's Office
P.O. Box 50110
Lusaka, Zambia

Fax: +260-1-250753

8th July, 1999

**CONTRIBUTING FACTORS TO THE HIGH PREVALENCE OF
TUBERCULOSIS AMONG NURSES IN UTH**

CONSENT FORM

Dear Nurse - Respondent,

Due to the increasing people suffering from pulmonary tuberculosis in the community and a corresponding increase in number of patients admitted with tuberculosis in UTH, it has become necessary to find out the number of nurse-respondents infected with mycobacterium tuberculin by carrying out tuberculin Skin Tests (TST) and sputum smear tests.

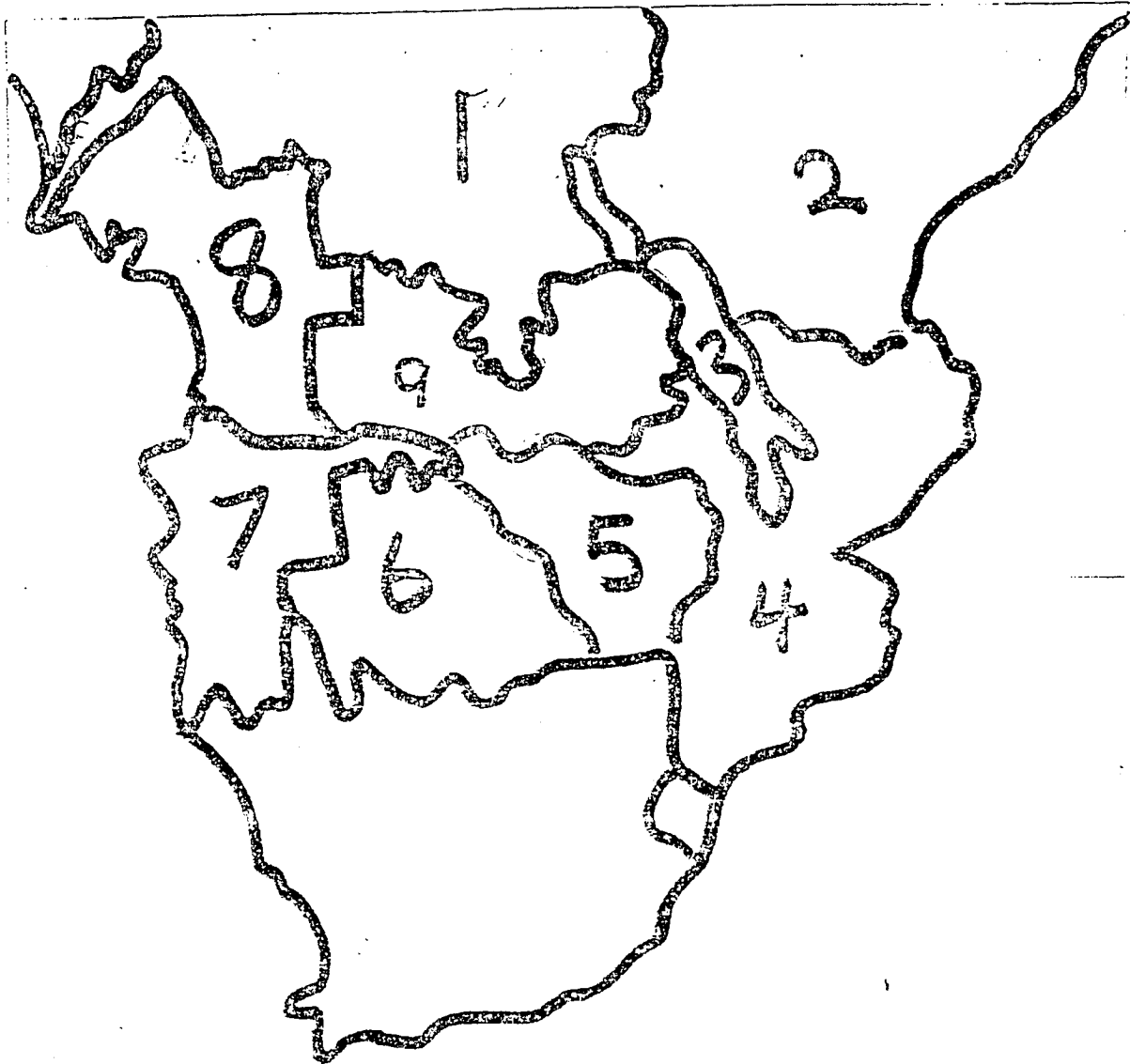
Your participation would help us to find out the contributing factors to tuberculosis infection among nurses as well as provide information that will be useful in designing strategies for prevention and protection of nurses from acquiring tuberculosis in the community and the hospital.

I understand the objectives of your study and agree to have TST and sputum tests chest x-ray carried out on me.

CONSENT/NAME... ..

SIGNATURE... ..
D. CHIANDA – MPH STUDENT

ZAMBIA AND NEIGHBORING COUNTRIES



LEGEND

- 1 CONGO 2 TANZANIA 3 MALAWI 4 MOZAMBIQUE
5 ZIMBABWE 6 BOTSWANA 7 NAMIBIA 8 ANGOLA
9 ZAMBIA

Annex-**MARKING KEY TO KNOWLEDGE QUESTIONS**

Question numbers	Responses	Scores
19.How is TB. spread?	All four are correct.	04
20. How to protect self from acquiring TB.	All four are correct.	04
21.Functions of the face mask.	Prevention.	01
22.Do you know TB. Prophylaxis?	Yes,	01
Name the TB. prophylaxis	Isoniazid.	01
23. How to control the prevalence of TB. among nurses..?	All nine are correct responses.	09
24. What do you understand by MDR.TB.	The TB. that is resistant to 2 or more antituberculous-is drugs.	01
25. Which patients are prone to MDR.TB.?	Defaulters.	01
26. What are the damagers of MDR. TB?	Resistance to treatment. Tb. germs are easily spread.	01
27. Name the TB. preventive services in the Hospital.	Chest X-Ray.	01
Did you have BCG as a child?	Yes / No.	1/2
Give date of last BCG.	Date of last BCG. Given	1/2
TOTAL		24

RATING OF SCORES:-

17-24 = excellent knowledge

12-16 = good knowledge

6-11 = Poor knowledge

<6 = Inadequate knowledge

WORK PLAN FOR RESEARCH (GHANT CHART)

