Mortality Trends at the University Teaching Hospital over a period of 10 years (1990-1999)

By

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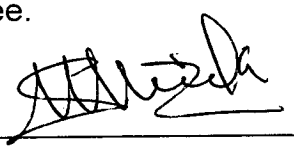
DECLARATION

I hereby declare that the work presented in this dissertation had not been presented either wholly or in part for any other degree and is not currently submitted for any degree.

Signed 

(Student)

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(Supervisor)

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DEDICATION

To my wife, Joyce, and my children Chilambwe, Duba, Wiza, Longwe

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I wish to register my special acknowledgements to the following for their important contributions:

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I would like to thank all those not mentioned but who in invariable ways helped make this a success.

DEFINITION OF TERMS

Aetiology	Causative agent
Anaemia	low blood level for that age group
Antibiotic	Chemical agent used against bacterial
Antihypertensives	Drugs used to lower blood pressure
Cardiovascular	The Heart and blood vessels
Crude Birth Rates	Birth per 10 000 of population
Encephalopathy	Disease process of the brain substance
Enteropathy	Structural and functional abnormality of the lining of the gut
Extrapulmonary	Other than the lungs
Hematuria	Presence of blood in urine
Hypotension	Low blood pressure

Immunocompromised; State of Lowered Defense System of the body

Incidence	The frequency of occurrence of some event related to disease

Infant mortality Rate; Number of deaths of infants (Children less than 1 year) per 000 live births

Maternal Mortality Rate; Deaths of mother s per 100 000 live births

Metastasis	Spread of disease from one site of the body
Morbidity	Frequency of illness
Mortality	Frequency of deaths
Pericarditis	Inflammation of the covering of the heart
Pneumothorax	Trapped air in lung tissue
Prevalence	Proportion of people affected by a disease at a, particular time
Pulmonary	concerning the lungs
Splenectomy	Surgical removal of the spleen

LIST OF ABRREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ATT	Anti-tuberculous Therapy
COAD	Chronic Obstructive Airway Disease
CSO	Central Statistical Office
DM	Diabetes Mellitus
DOTS	Directly Observed Therapy
GDP	Gross Domestic Product
HDI	Human index Rank ?
HIV	Human Immunodeficiency Virus
IMR	Infant Mortality Rate
LDHMT	Lusaka District Health Management Team
MMR	Maternal Mortality Rate
NCD	Non-Communicable Disease
NLTP	National Tuberculosis and Leprosy Programme
NTP	National Tuberculosis Control Programme
RBM	Role Back Malaria
RHD	Rheumatic Heart Disease
SCC	Short Course Chemotherapy
STD	Sexually Transmittable Disease
TB	Tuberculosis
URTI	Upper Respiratory tract Infection
UTH	University Teaching Hospital
WHO	World Health Organisation

LIST OF TABLES AND FIGURES

"Death and Disease are not uniformly distributed around the globe.
Life expectancy is still overwhelmingly correlated with the degree of poverty/wealth
The WHO calls poverty the world's biggest killer."

WHO-Spring 2002

ABSTRACT

Setting- Medical Information Center, Department of Medicine, University Teaching Hospital, Lusaka, Zambia

Objective-To determine the mortality trends at the University Teaching Hospital over a period of ten years (1990 to 1999).

Design- A retrospective, records review study.

Methods- Records ware reviewed looking at data of admissions, discharges and deaths to the medical wards over the study period. Review of deceased patients' files carefully selected for each medical condition. Information was entered on data entry sheets on the computer. It was analysed using Epiinfo6 and excel.

Results- All mortality rates were getting worse year after year. Highest death rates were due to Meningitis (49.9%), Tuberculosis (27.6%), Other Anaemias (than Sickle Cell Disease) (25.5%), Other forms of heart disease (Other than rheumatic) (26.3%), Diarrhea (22.1%), Upper Respiratory Tract Infection (19.7%), Diabetes Mellitus (19.2%), Pneumonia (16.9%), Malaria (10.4%)., Hypertension (7.6%).

Conclusion-, Mortality rates worsened over the years for the top ten killers. Malaria was no longer among the top 5 causes of death. Infections account for 80% of deaths. Attributed reasons for increase in death rates include HIV/AIDS pandemic, overcrowded wards and shortages of surgical medical supplies and health providers, breakdown of the referral system and decline in the national economy.

CONTENTS

CHAPTER 1

INTRODUCTION

Zambia is a land-locked country covering an area of 752,612 square kilometres and consisting of about 2.5 % of the area of Africa and is as big as France, Switzerland, Austria and Hungary put together. It shares borders with Zaire and Tanzania in the north; Malawi and Mozambique in the east; Zimbabwe and Botswana in the south; Namibia in the southwest and Angola in the west.

Zambia lies between 8 and 18 degrees south latitudes and 20 and 35 degrees east longitudes. It has a tropical climate and vegetation with three distinct cool-dry; hot-dry; and warm-wet seasons.

Administratively, the country is divided into nine provinces and 67 districts. Four out of ten Zambians live in urban areas, mostly located along the old line of rail.

Zambia has a mixed economy consisting of a modern urban oriented sector confined to the line of rail, and a rural agricultural sector. For a long time the modern sector has been dominated by parastatal organisations, while private businesses have predominantly been in the construction and agricultural sectors. The change of government in 1991 saw the introduction of a liberalised market oriented economy, which saw many parastatal organisations being privatised.

Since the mid-1970s, poor economic performance has led to lower GDP. For instance, GDP per capita (with consistent 1977 prices) declined from $350 in 1980 to $264 in 1994, representing an annual decline of 2%. In 1989, the GDP rose by 0.1%, in contrast to 6.3% in 1988. On average, real output declined by about 1.0% annually between 1989 and 1991(1).

Statistics from the World Trade Organisation show that Zambian economy has been declining since 1995. Gross Domestic Product (GDP) in the manufacturing, agricultural and mine sectors has decline drastically. The chief economist of Zambia Association of Chambers of Commerce and Industry reported that Zambia's industrial base has shrunk and has yet to recover (2).

In an effort to halt the economic recession, government launched the Economic Recovery Programme (ERP) to turn round the "protracted decline in the economy, to sustain and improve the living standard and quality of life of the people"(3).

In 1991, the government also launched the health reforms programme, which was financed by the government with the aid of co-operating partners. This resulted in the decentralisation and strengthening of provincial and district health institutions. This was done with the hope of improving health standards (4).

Zambia's population, as per census of 2000, stands at 10.28 million (5) compared to a census count of 7,759,167 of 25th August, 1990. The average annual inter-censal population growth rate for Zambia between 1990 and 2000 was 2.9% compared to 3.1% of 1980 and 1990 census. (5)

Some interesting statistics of Zambia show that the Human Index Rank (HDI) is 151(1999, UNDP). The total adult literacy rate is 78. The crude birth rate (births per 1,000, pop) is 42(1999) and the crude death rate (death per 1,000, pop) is 20(1999). The Maternal Mortality Rate (per 100,000 live births) is 642. (1992).

There has been a progressive decline in life expectancy over the decade. In 1990 it was at 50, dropping to 42 in 1995 and 40 in 1998. It is projected that by the year 2010 the life expectancy will be 33. The total fertility rate in 1998 was 5.5. Although on the decline, this rate remains the highest in sub-Saharan Africa (6).

Lusaka, the capital city of Zambia, measures 360 square kilometres with a population of about 2,000,000(5) (preliminary report, Census, 2000). In the last 20 years there has been a proliferation of squatter compounds without an equivalent provision in essential social amenities. The consequent is their resulting in being breeding grounds for infectious diseases. The University Teaching Hospital, the largest hospital in the country works not only as the main referral centre but also as one of the daily health facilities in the city. This is in addition to private or selective hospitals such as the Lusaka Mine hospital, Maina Soko Military hospital, 21 urban health clinics and about 40 private clinics. Other health services include traditional healers who are visited by a large number of the population.
The University Teaching Hospital with a bed capacity of 1863 is one of the level three hospitals in the country. Though the institution is meant to provide tertiary care, it also provides primary and secondary care services for Lusaka district.
The institution is inadequately funded, inadequately staffed, and is overcrowded.
The Department of Medicine admits all kinds of medical conditions. It receives referral cases not only from Lusaka, but throughout the country as well. Bed capacity in the department is 287. Every year the department has increasingly become busy but without a corresponding increase in staffing levels. This has greatly compromised available nursing care. The congestion has meant some patients being discharged prematurely and other patients being accommodated on make-shift floor beds (7).

A clinical observation shows that among the causes of deaths are Malaria, Tuberculosis, Pneumonia, Diarrhoea, Meningitis, Hypertension, Diabetes and most recently AIDS(5).

Approximately 20% of the adult population are infected with HIV, the virus that causes AIDS. It has been projected to increase infant mortality two-fold and child mortality three-fold, erasing gains made over 50 years in child survival(6).

As a result of HIV/AIDS among adults aged 15 to 49 years old, mortality is expected to triple from levels already eight times higher than those of Western countries. In Zimbabwe and Zambia, AIDS accounts for 60-80% of deaths among adults in this age group. This may be less so in South Africa but only because the effect of the AIDS epidemic is more recent. It is estimated that by 2010, at least 4 million South Africans, 1.5 million Zimbabweans and 800,000 Zambians will have died of AIDS (8).

The main objective of the introduction of Health Reforms by the government in 1991 was to decentralise health facilities and bring the services close to the people. Other objectives included a reduction in malnutrition, reduction in cases of tuberculosis and increased accessibility of family planning.

In all these changes, there was no active review of trends of morbidity and mortality in centres of health provision in order to provide continuous flow of information that could be useful for planners and administrators.

CHAPTER 2

LITERATURE REVIEW

INTRODUCTION

Globally about 47 million people died in 1990 and 51 million people of all ages died in 1993, about three-quarters of them adults. Some 39 million deaths took place in the developing world and about 12 million in the developed, making it three times more deaths than rich ones (9).

By 2000, it was estimated that more than 60 million people were dying world wide each year. In 1996, according to the WHO, of the 56 million who dies that year, only 1/4 came with reliable cause of death information.

In developing nations, fully 42% of deaths appeared to be from communicable diseases, whereas in developed nations these account for only 6.1%. The susceptibility to communicable diseases differed widely by region and country - Africa 65%, Latin America 31%; China 16%, India 52%, etc.

In industrialised nations infections are not of bigger concern. Infections include pneumonia (10%), diarrhea (7.5%), TB (5%) and measles (3%) (12).

Malaria, directly or in association with acute respiratory infections and anaemia, causes around 2 million deaths a year, the vast majority among young children, and some 400 million cases annually. Globally more than 2 billion people are threatened. The estimated direct and indirect cost of the disease in Africa alone is expected to reach US $1.8 billion by 1995(9).

COMMUNICABLE DISEASES

Communicable diseases such as tuberculosis and respiratory infections as well as maternal, peri-natal and neonatal conditions account for about 20 million, or about 40%, of the 51 million global deaths; and 99% of these occur in the developing world (9).

Of the 20 million deaths due to communicable diseases more than 16 million, or about 80%, are due to infectious and parasitic diseases. Tuberculosis kills about 3 million people, malaria around 2 million (9) (12).

Among the major communicable diseases, tuberculosis was responsible for more than 5% of the global total of deaths - over 7 000 a day - equal to more than 1 000 new cases every hour of every day (9). Drug treatment, in most cases costing as little as US $13-30 per person for a full course of TB drugs can cure people; but access, availability, adherence and compliance issues are major challenges for public health.

Meanwhile the lethal relationship of tuberculosis with HIV is making the death toll many times worse. AIDS together will kill more people than the entire populations of the cities of Singapore, Beijing, Yokohama and Tokyo combined (9).

African trypanosomiasis (sleeping sickness), kills an estimated 55 000 people a year. Schistosomiasis (bilharziasis or snail fever) affects 200 million people in 74 countries in the Americas, Africa and Asia and kills perhaps 200 000 people. Leishmaniasis infects about 13 million people. Visceral leishmaniasis, also known as kala-azar, is the most severe form. Almost always fatal if untreated, it causes some 500 000 cases and more than 80 000 deaths a year. Lymphatic filariasis (elephantiasis) affects around 100 million people, while Ascaris causes clinical symptoms in as many as 214 million people, Trichuris in 133 million and hookworm in 96 million.

HIV and AIDS continue to spread relentlessly. WHO estimates that in 1994 HIV prevalence among adults worldwide was over 13 million. Some 6 000 people are

becoming infected each day. In parts of Africa and Asia the virus is advancing rapidly. In southern and southeastern Asia HIV infections were estimated at 2.5 million - a million more than in 1993 (9).

UNDP 1999, focusing on environment and health, summarized the world situation AIDS situation. AIDS killed 2.5 times more people than malaria. More than 33m worldwide were suffering from HIV/AIDS. Over 95% of all those infected are in the developing nations.16 countries have 15-49 age group HIV infection rates of 10% or greater, all in Africa. Botswana has 35.8% of its 15-49's living with HIV/AIDS (12).

NONCOMMUNICABLE DISEASES

Noncommunicable diseases such as cancer and heart disease account for about 19 million deaths, or 36% of the global total, divided more or less equally between the developing and the developed world. The great majority of such deaths are among adults (9).

Experts of the World Health Organization (WHO) have expressed their concern over the potential perils of inadequate attention to the prevention of noncommunicable diseases (NCDs) both in developed and, especially, in developing countries (11).

One look at mortality statistics will suffice to grasp the magnitude of the problem worldwide. NCDs are responsible for at least 40% of all deaths in developing countries and 75% in industrialized countries, where CVDs are the first cause of mortality and cancer the third.

However, mortality statistics alone do not provide a full picture of the global social and economic burden of NCDs: in addition to being life threatening, many of them are also disabling. (10).

Noncommunicable diseases such as those of the circulatory system account for 10 million deaths globally, with more than 5 million due to heart disease and another 4 million due to cerebrovascular conditions (such as stroke). These and other noncommunicable diseases that primarily affect adults are also emerging as a major cause of death in the developing world. Although until recently heart disease and stroke were perceived as problems of the developed countries, about 44% of total deaths from these causes now occur in the developing world. Cancer accounts for 6 million or 12% of deaths globally - with the majority of them, 58%, in the developing world.

In developing countries, out of an estimated 40 million deaths which occurred in 1997, major noncommunicable diseases caused 15,2 million. Projections prepared by WHO indicate that, during the next 25 years, the burden of disease will shift from infectious to noncommunicable diseases (10).

In absolute figures, major noncommunicable diseases -- CVDs, cancer, diabetes, chronic respiratory diseases and hereditary disorders -- are responsible for some 25 million deaths worldwide annually with two-thirds occurring in the developing countries. (10).

Diabetes mellitus is a growing public health problem in both developed and developing countries. A recent WHO expert group estimated that more than 100 million people would suffer from diabetes by the end of the year 2000 - 85-90% with the non-insulin dependent form. In Europe the prevalence of diabetes is 2-5% per cent of the adult population. In India a quarter of the population is affected by the age of 60, and 1 in 5 North Americans will acquire the disease by the age of 70. (9). Diabetes mellitus alone, claims on average around 8% of total health budgets in industrialized countries (11).

In Africa, hypertension rates are rising sharply, as is the prevalence of diabetes. In a large percentage of affected individuals, both conditions remain untreated. Rheumatic fever and rheumatic heart disease are major causes of premature

mortality, and account for one third of all cases of cardiac disease admitted to hospitals (10).

NCDs IN DEVELOPING COUNTRIES

There is still a wide-spread misconception that the problem of NCDs is not relevant for the developing world, that it is a burden of affluent societies only. WHO experts say that scientific evidence testifies to the contrary: In developing countries, out of a little more than 39 million deaths, which occurred in 1993, more than 10 million were caused by the major NCDs. These statistics do not include deaths due to nutritional, gastro-intestinal, endocrine, neuro-psychiatric, sense organ, and genito-urinary diseases which account for an additional 3 million deaths in the developing countries each year.

Surveys of indigenous populations in a number of African countries indicated that hypertension rates are on the rise, as is the prevalence of diabetes. In a large percentage of affected individuals both conditions are being left untreated. In Seychelles, hypertension affects 22 % of the population; in South Africa - 16 %; in Mauritius - 14 %. Diabetes affects from 4 to 15 % of the population of the three countries. In Tanzania, the prevalence of major NCDs in the urban population is four times higher than in the rural one, 12.8 % to 3.1 % respectively. In Africa as a whole, rheumatic fever and rheumatic heart disease are major causes of premature mortality and account for one third of all cardiac diseases admitted to hospitals. In addition, recent studies make it possible to suggest that about 14 % of the African population have a sickle cell gene which considerably increases their chances of having children with this disorder (11).

In Latin America, NCDs are on a steady increase. In Chili, for example, CVDs, cancer and diabetes are responsible for 27.4 %, 18.2 % and 1, 8 % respectively of all deaths occurring in this country. In Cuba, hypertension prevalence in men and women has reached 34.5 % and 27.1 %, while diabetes affects 5.7 % of women and 2.9 % of men (9).

Given the present trends, scientists project an explosion of noncommunicable diseases in developing countries between now and the year 2015. By then, for example, the ratio of deaths from NCDs to deaths from infectious and parasitic diseases will be 1:1 in Africa both for male and female, 1:1 and 2:1 respectively in the Middle East, 4:1 and 4:1 in Asia, 6:1 and 4:1 in Latin America. According to these projections, in developing countries in general three times more people will die from NCDs than from infectious and parasitic diseases (11).

Of all global research, only 0.2% of the funding goes to medicines aimed at the common diseases, like diarrhea pathogens, pneumonia and TB, that cause close to 20% of all morbidity. High-cost research performed by private corporation's neglects opportunities to develop technology for poor people. For instance, in 1998 global spending on health research was $70 billion, but just $300 million was dedicated to vaccines for HIV/AIDS and about $100 million to malaria research – loads went to allergies, cholesterol, etc (12)

Out of 1,223 new drugs marketed worldwide between 1975 and 1996, only 13 were developed to treat tropical diseases—and only 4 were the direct result of pharmaceutical industry research. Previously, much drugs research was carried out by government labs and later licensed to companies (12).This means that more effort should be put in to fund treatment of infectious diseases in the third world.

THE UNIVERSITY TEACHING HOSPITAL

The University Teaching hospital (UTH) is located in Lusaka, the capital city of Zambia .Its mission statement is "To provide cost effective health care, function as a national referral center, train health care providers, conduct research and enhance understanding of existing health problems and for the development of science." It is one of the level three hospitals in the country. Though the institution is meant to provide tertiary care, it also provides primary and secondary care services for Lusaka district, which has a population of about two million people (13) within the catchment area of Lusaka there are several other service providers, the major one being the Lusaka District Health Management Team (LDHMT). (14) which has about eleven clinics in the periurban area. However, UTH still remains the main admitting institution.

Over the last ten years or so, the country has experienced economic hardships and transformation, partly due to the closure of mines, the main source of revenue. The country also underwent economic reforms which resulted in retrenchments. The final result was 80 percent leaving below the poverty datum line. Lusaka has experienced emergence of unplanned housing in the peri-urban areas.

This has directly resulted in overburdening the already limited facilities and social amenities available in the city. (13).

The institution largely depends on funding from the government through Ministry of Health. Due to the worsening economy, the hospital has experienced problems of a constricted budget that has to cater for an ever increasing disease burden. The hospital has also suffered brain drain of all grades of professional staff who have left for greener pastures (13)(14)(15).

The constricted budget has led to continuous shortages of essential drugs and surgical medical supplies. It has also led the institution to be unable to pay certain personal emoluments on time consequently leading to a demoralised staff. Some

of the consequences of this include failure by the institution to be able to make long term plans such as adequate provision of staff accommodation or management of repairs of old infrastructures.

Unavailability of essential drugs, surgical supplies and diagnostic facilities has led to delay in diagnosis, treatment and discharge. Poor prevailing conditions of service has led to progressive reduction in numbers of critical personnel who have left for greener pastures (13)(14). This has had a direct effect on morbidity and mortality trends.

Clinical observations have shown increased total number of medical admission to the University Teaching Hospital over the last ten years. Infections seem to be more common reason for admission than 'noninfectious' causes. There seems to be an increase in respiratory tract infections and gastrointestinal diseases and 'malaria'. Respiratory conditions include pneumonias, pulmonary tuberculosis and suspected pneumocystis carinii pneumonia. Gastrointestinal conditions include diarrheas and vomiting. Others are peptic ulcer disease and ascites mostly due to chronic liver disease or suspected abdominal tuberculosis.

Meningitis and encephalitis are also a common cause of admission. Stroke due to none hypertensive causes also seem to have risen especially among the young patients below the age of 49.

DESEASES UNDER REVIEW

Human Immunodeficiency Virus (HIV) / Acquired Immunodeficiency Syndrome (AIDS)

The HIV/AIDS epidemic has become a serious health and development problem in many countries around the world including Zambia. There were estimated 33.4 million HIV infections in 1998, of which 22.5 million were found in the sub-Saharan Africa. Another 13.9 million persons have already died from the disease since the beginning of the epidemic, mostly in Africa (15). An estimated 19.7 percent of the entire adult population (of about 6 million) aged 15-49 is currently infected (16).

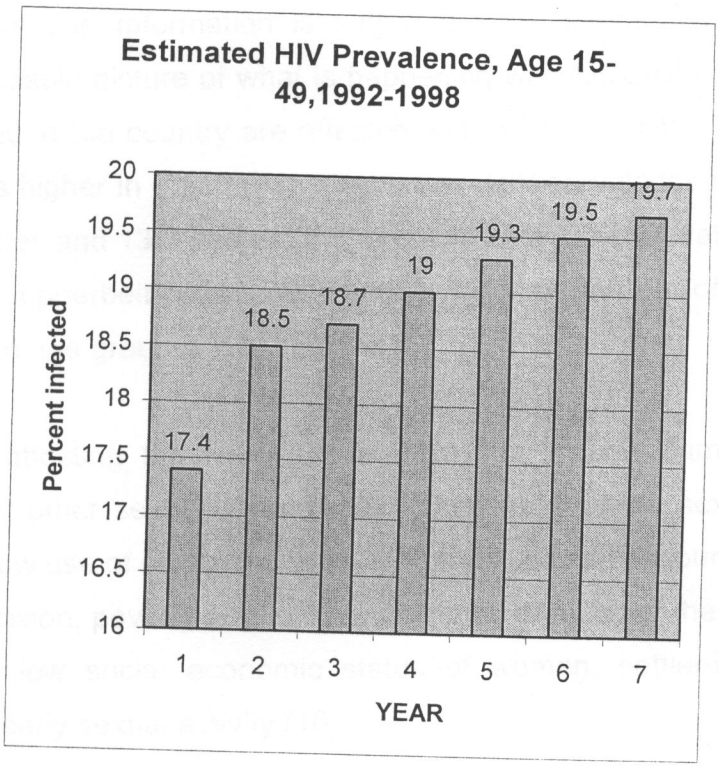


Fig. 4.1.Estimated HIV prevalence 1992-1998, Ages 15-49

Most of these people do not even know that they are infected. In addition to the 973 000 adults, nearly 87,000 children are infected mostly through mother -to -

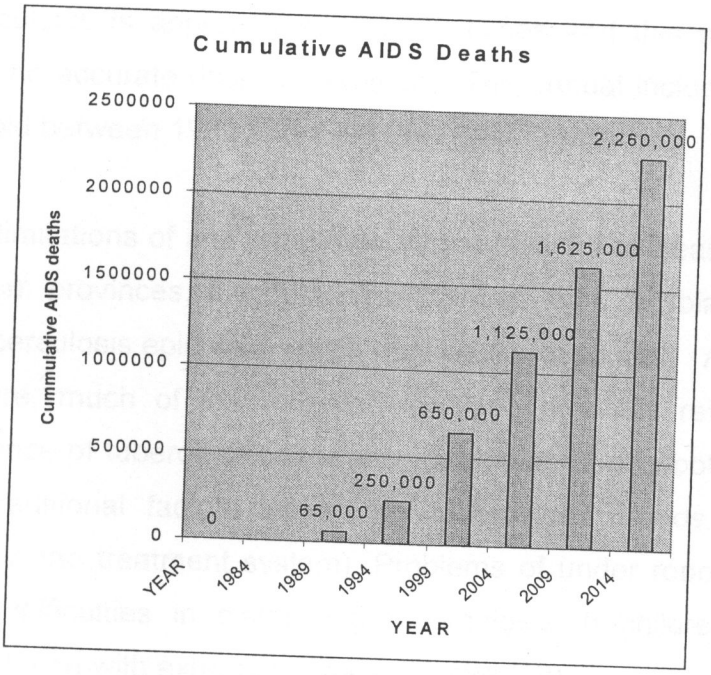
child transmission. From the beginning of the epidemic (1984) more than 600 000 have developed AIDS. It is approximated that it takes up 2 to 12 years to develop AIDS from the time one is exposed to the virus. Between 90,000 and 100 000 persons now develop full-blown AIDS each year (17). The main mode of transmission is through heterosexual contact. With no cure available for AIDS, the cases are increasing and the disease threatens the social and economic well being of the country. The epidemic has resulted in an up swing of admissions due to infections, for example tuberculosis (15).

Statistics of HIV and AIDS are as a result of sentinel surveillance and population based surveys and information is sufficient from different sources to draw a reasonably reliable picture of what is happening with AIDS/HIV in Zambia. All the nine provinces in the country are affected with AIDS and HIV. The prevalence is about 2 times higher in urban than rural areas- HIV prevalence is over 28 percent in urban centres and 13.6 percent in the countryside. The prevalence is highest in Lusaka and Copperbelt provinces, where more than one out of every four in the 15-49 year old age group is HIV infected.(6) .

The factors affecting the HIV/AIDS epidemic in include Zambia include, high prevalence of other sexually transmitted diseases, multiple sexual relationships, traditionally low use of condoms, even in high-risk sexual encounters, low levels of male circumcision, poverty and low health status of much of the population. Other reasons are low social economic status of women, settlement patterns and mobility and early sexual activity (18).

It has been estimated that the death toll from AIDS would continue to rise and would be staggering. Approximately 650 000, by 1999 since the beginning of the epidemic. Over the period from 1999 and 2014, an additional 1.61 million Zambians are likely to die from the disease, which would result in cumulative total of about 2.26 million deaths by 2014 (fig.2).

Fig. 4. 2. Cumulative AIDS cases in Zambia



The AIDS epidemic has increased death rates in all ages. However the impact has been most severe among adults in the prime working ages and among children under the ages of 5. Without AIDS and assuming a gradual decline in death rates from other causes, the annual death rates among adults aged 15-49 would be 210 deaths per day (110,000 per year) among 15-49 years olds. (15) This rapid increase in deaths in the productive age group has and will continue to have serious consequences for the economic and social developments, with a direct impact on the health system.

Mycobacteria Tuberculosis in Zambia

Zambia, like most sub-Saharan African countries, is in the midst of a major epidemic of Tuberculosis. Despite the declaration by the World Health Organisation of tuberculosis as a global emergency in 1993, there are no indications that the epidemic is abating. Clinical observation on a daily basis confirms that today, tuberculosis remains a major cause of morbidity and mortality and a persistent threat to the health of the population of Zambia. The estimated prevalence of tuberculosis is approaching 100,000 cases and this may be an underestimate since no accurate data are available. The annual incidence of TB has increased four-fold between 1982 and 1996 (19) (20).

Notwithstanding the limitations of analysing data by the Ministry of Health records of annual returns from provinces, the data clearly shows that Zambia is in the midst of a serious tuberculosis epidemic, which may be out of control. Although it is difficult to measure, much of the recorded increase probably reflects real changes in the incidence of tuberculosis. The increase being due to both the HIV epidemic and the traditional factors influencing tuberculosis trends (poverty, malnutrition, failures in the treatment system). Problems of under reporting may be compounded by difficulties in diagnosing tuberculosis in children and in pregnant women and those with extra-pulmonary disease (19).

HIV and Tuberculosis in Lusaka, Zambia

The World Health Organization has declared AIDS and TB global emergencies. They are now the leading causes of death among the poorer sections of the community in sub-Saharan Africa and are priority target diseases for the national health programs of Zambia and other African sub-Saharan countries.

Zambia is now classified as one of the poorest countries in the world. TB and HIV are leading causes of hospital admissions, and deaths in patients of all age groups in Zambia. The notification rate per 100,000 population of newly diagnosed patients with TB has increased 5-fold in the last 10-15 years from approximately

100/100,000 between 1975-1985 to 350/100,000 in 1994 and an estimated 550/100,000 in 1998(16).

Increased mortality rates in HIV-infected Zambians with TB

In contrast to HIV-negative patients, follow-up studies of HIV-positive patients treated for TB in Lusaka indicate that although they may respond well in the short-term they have significantly increased mortality rates (21). In a prospective two-year follow-up study of previously untreated Zambian patients with TB (174 with HIV infection and 65 without HIV infection), mortality rates were significantly higher in the HIV-positive group at all stages of follow-up, (35% of HIV-infected patients died before the end of scheduled treatment compared to 9% of the HIV-negative patients). By the end of 24 months follow-up 68% of the HIV-positive and 27% of the HIV negative patients had died. The crude mortality rate ratio at 2 years for HIV-positive compared with HIV-negative patients was 5.00. Primary resistance to anti-TB drugs is low in Zambia. Recurrence of TB may account for some of the deaths, however, clinical observations from West and East Africa, indicate that other opportunistic infections are likely to be responsible for the increased mortality rates. (22).

A study of maternal mortality at the University Teaching Hospital, Lusaka, Zambia: the emergence of tuberculosis as a major non-obstetric cause of maternal death. Between 1983 and 1989 Showed Of these, 106 (42%) were due to direct (obstetric) causes and 145 (58%) were due to indirect (non-obstetric) causes. Malaria (30%), tuberculosis (25%) and unspecified chronic respiratory tract infections (22%) accounted for 77% of non-obstetric causes of maternal deaths and 44% of all causes of maternal deaths. The diagnosis of AIDS was closely linked with that of tuberculosis (92% of cases), and unspecified chronic respiratory illnesses (97%), but not with malaria (37%). The maternal mortality ratio for UTH was calculated at 921 per 100,000 live births, a significant increase from the 118 noted in 1982 and 667 in 1989. Is thus without doubt that TB and HIV a major contributors to maternal mortality in UTH as well (23).

Diarrheal Diseases in Zambia

The HIV epidemic is a major health problem in the world today especially in sub-Saharan Africa. The new epidemic has brought with it new disease patterns which include infectious conditions caused by infections which previously were not major health concerns.

Diarrhoeal diseases are a major cause of morbidity and mortality in Zambia. Before the HIV epidemic, the illness was more common in children than adults and the common type of diarrhoea then was the acute than chronic. However over the last ten years, clinical observation shows an increase in both admissions and deaths due to persistent or chronic diarrhea among adults. Most of these patients have clinical evidence of HIV disease. This strongly suggests an association of AIDS with the increase in these admissions.

Persistent diarrhea is one of the most common manifestations of HIV. It is largely caused by organisms like *Cryptosporidium, Microsporidium, Isospora belli* which until emergence of HIV, were not recognised as being organisms of great medical significance.

In Lusaka, 1% of the adult population has persistent diarrhoea at any given time (24). Studies done in Zaire, Uganda and Tanzania show that occurrence of diarrhoea in AIDS varied from 40-70 % (25).

Associated with diarrhoea is an entity called enteropathy, which refers to structural and functional changes in gut mucosa in response to local or systemic factors. Reduction in villous height and increase in crypt depth occurs. There is sometimes hyperplasia of cells of inflammation.

Studies done in Zambia and elsewhere show that *Cryptosporidium, Microsporidium* and *Isospora belli* are emerging as the three commonest causes of HIV- related persistent diarroea.

Two previous studies by Conlon et al 1996 have shown that parasitic infections are a major contributor to the HIV-related persistent diarrhoea. Conlon's study demonstrated that *Cryptosporidium, Microsporidium, Isospora belli* and *Strongyloides stercolaris* were the common organisms found in 32%, 16% and 6% of HIV related diarrhoea cases respectively. This study was the first in the UTH to try to establish the organisms involved in HIV related Diarrhoeas.

Studies done elsewhere have also shown an increase in protozoal infections as identified in Lusaka. In the preliminary studies done in Uganda, *Cryptosporidium* and , *Isospora belli*, were common in stools in patients with slim disease. In the United States and Europe, diarrhoea due to *Cryptosporidium* and , *Isospora belli* are found in up to 15% of homosexual men with HIV-related diarrhoea. (26).

Apart from AIDS there other disease conditions, which would cause chronic diarrhoea though they are not common .e.g. Tropical sprue, gastrointestinal malignancies

. Tropical enteropathy a condition recognised throughout the developing world including Zambia is characterised by asymptomatic jejunal abnormalities and Xylose malabsorption in apparently healthy people (27). Malignancies such as lymphomas and Karposis disease are known causes of chronic diarrheas, but are probably underdiagnosed in our setting.

Various studies have demonstrated the prevalence of HIV related enteropathy in HIV infection and in patients with HIV related persistent diarrhoea. Conlon et al and Kelly et al in separate studies have demonstrated the presence of villous

blunting and inflammation on duodenal histology in HIV infected Zambian patients with chronic diarroea (28)(25)(26).

Cardiovascular Disease in the Tropics.

The prevalence and pattern of cardiovascular disease is changing dramatically and continuously in the tropics as a consequence of urbanization and westernisation (29). Therefore the pattern of disease described in any country is of point prevalence and no more. Although there are reliable data from South Africa and some West African countries, good sequential or comparative studies are uncommon and their methodologies are often inconsistent (30).

In Abidjan, Cote d'Ivoire, coronary arterial disease has risen as a proportion of all cases of cardiovascular diseases from 1.2 to 6.5%. Endomyocardial fibrosis has fallen, and pericarditis has risen, human immunodeficiency virus (HIV) infection having contributes to this.(3.5 to 8.8%). Rheumatic disease and hypertensive heart disease are largely unchanged (36.7 to 39%) (31).

It is not possible to extrapolate from one country neither to another nor from one area to another in the same country, but trends are evident. As urban life gets more influential, coronary arterial diseases rise, hypertension persists and some infections decline; but HIV may lead to a rise of tuberculous and pyogenic pericarditis.

Clinical observations in this institution have shown an increase in both admission and deaths due to some cardiovascular conditions. Data is not available to demonstrate clearly changes in mortality and morbidity in other parts of the country partly because of the decentralisation of the recording system and also lack of publications (32).

There seems to be an increase in admissions and deaths in diseases conditions like pericardial effusion and cardiomyopathy. There seems to be no much change

as regards mortality due to hypertension or rheumatic heart diseases as regards mortality, though admissions from the same remain high.

Hypertension

Hypertension is the most frequent and important risk factor for cardiovascular diseases. Its prevalence is estimated to be around 20 million in our tropical regions. Some 250,000 deaths could be prevented each year through effective
High blood pressure is a major risk factor for perinatal and maternal mortality. Throughout the tropics, eclampsia-which has many features akin to Hypertensive encephalopathy, is thought to be killing over 50 000 women per year. Much of our knowledge on hypertension and its consequences on the tropics have come from studies African or Indian subcontinent settlers in the West Indies.

It has been estimated that hypertension rates in Africa are rising sharply, as is the prevalence of diabetes. In a large percentage of affected individuals the condition remains undiagnosed (10).

Clinical observations seem to show that there also has been an increase in the number of admission due to hypertension. This could partly be due to the increase of total medical admissions to the medical wards than an increase in prevalence.

Complications of hypertension include heart failure, stroke and myocardial infarction. Heart failure due to hypertension is an important cause of admission and death to the medical wards. Number of stroke patients has definitely risen over the past ten years, though not due to hypertension. Stroke in non hypertensive seem to be high in the age group between 16 and 49 years.
Myocardial infarction still remains rare (or is it under diagnosed?). The few observed have come from the Asian community.

Hypertension currently accounts for approximately 7 percent of all deaths worldwide, and this figure will no doubt rise as more societies adopt the habits and lifestyle of industrialized nations.

Rheumatic Cardiac Disease

Rheumatic heart disease is still frequent despite the availability of several potential cost-effective measures for prevention of rheumatic fever. Its prevalence may reach 15 per 1000 in school children (3) and it remains active during second and third decades of life. This has direct consequence on society and families and will increased demand for health care. (32).Globally, Rheumatic fever and RHD are major causes of premature mortality, and account for one third of all cases of cardiac diseases admitted to hospitals(10)

This is probably the greatest cardiovascular scourge in the tropics; it cripples and disables children, adolescents and young adults, and no health service has overcome it; but the pattern is changing (33). As countries become richer and people have better homes, food and health care, so the disease, essentially an affliction of the overcrowded poor is becoming less prevalent, but in India and Pakistan (34) in much of Africa (35), and among the urban poor,(36),rheumatic fever and Rheumatic Heart Disease account for 12-30% of cardiovascular morbidity ; with significant differences between richer and poorer in these countries. In Hong Kong and some Latin American countries, however, the prevalence has been falling significantly (37) In Sri Lanka, lesions of the mitral valve are less severe and re-stenosis after surgery less common. Rheumatic heart disease in poor communities in the tropics differs from the formerly familiar pattern in the industrialized countries(38) It affects young children and has different clinical feature;(39) It affects the heart more commonly both in the first attack and in recurrences, and, on account of weak health services, its secondary prevention is very difficult indeed.

In all countries where prevalence studies have been carried out as part of the major WHO program for the prevention of rheumatic fever and rheumatic heart diseases, a wide range in prevalence has been found. WHO have taken as a baseline for the 16 collaborative project countries, a mean prevalence of 10/1000 for established rheumatic heart disease and an incidence of rheumatic fever of 100/100 000, but this varies greatly and available studies have not taken the same age group or used the same methods.

It is difficult from clinical observation whether Rheumatic heart disease pattern of admission and deaths have changed, but it is the most important cause of valvular heart diseases in Zambia. Mortality is high because of lack of surgical facilites for corrective surgery.

Malaria

Malaria is primarily a disease of the tropics and is still the most important cause of fever and morbidity in the tropical world. In the early part of the last century two-thirds of the world population lived in areas where malaria was endemic. In tropical Africa where it is deeply entrenched, no fewer than 373 million people live in endemic areas where *Plasmodium falciparum* is the dominant parasite. The number of cases of clinical malaria has been estimated between 76 and 150 million annually, with the incidence showing little change over the last 20 years (40).

Outside Tropical Africa 6.5 million cases were recorded in 1982 (41). There has been a sharp drop in the incidence of Malaria in South-East Asia since 1977 reflecting a fall in India and Sri-Lanka (42), but with a slow increase in South and Central America.

Malaria has been eradicated from the whole of Europe, most of North America including the whole of the USA, most of the Caribbean, large parts of most of northern and southern South America, Australia, Singapore, Japan Korea and Taiwan (40).

Despite some success, global eradication has however, not been attainable for a number of reasons, including failure to develop effective insecticides, drug resistance and administrative and political difficulties. It has continued to be the main killer disease in the tropical areas including Zambia.

It has been observed by the Ministry of Health that malaria is exerting a negative impact on the socio-economic development in Zambia with cases increasing exponentially, 3 fold, from 122 cases in 1986 to 360 cases in 1996. The worst affected are children and pregnant women. All 9 provinces in Zambia are affected with the North-Western province being the most hit with 590 cases per 1000 and Lusaka with 265 cases per 1000 has the least. Since malaria is preventable and treatable, there is a need for concerted and coordinated effort from all partners to ensure sustained advocacy for an integrated malaria control approach (43).

WHO Regional Representative for Zambia reported that malaria is recognized as the number one cause of mortality and morbidity in most African countries. Roll Back Malaria (RBM) is conceived as a partnership not to be imposed on countries but to encourage them to harness effort to mobilize resources by all concerned for malaria control.

Malaria accounts for 12-20% deaths with 24 % of all health center admissions and 12% hospital admissions being due to malaria. There is therefore a need to identify, promote and employ new and innovative preventive and curative measure that can effectively reduce the burden of malaria.

In view of the above, the Zambia Government has re-affirmed its commitment to the RBM initiative (43).

Respiratory Problems

In an average outpatient department in the tropics, 20-40 % of patients have come with respiratory complaint, and 20-30% of the hospital admissions are for disorders predominantly affecting the lungs. Some patients come with respiratory complaints that might occur anywhere else in the world such as COAD while the majority comes with diseases that are more common or perculiar to the tropics only, e.g. pumonary schistomiasis. Still within the tropics patterns of respiratory diseases differ greatly from one region to another (44).

The Acquired Immune Deficiency Syndrome (AIDS) epidemic has had a major impact on the pattern of respiratory diseases in the tropics, particularly in its effect on the incidence and manifestation of tuberculosis. The possibility of underlying immunodeficiency virus (HIV) infection has an influence in the interpretation of symptoms and signs in patients with pulmonary problems (45).

The common occurrence of tuberculosis prevailing throughout the world, especially among HIV infected individuals has resulted in many patients with other causes of chronic cough suffering unwarranted lengthy therapeutic trials of antituberculous drugs. In South Africa out of 430 patients with 'unresponsive pulmonary tuberculosis' referred from district hospitals, over half did not have tuberculosis at all (T.F.B. Collins, personal communication). The variation in diagnoses which and included non-tuberculous bronchiectasis, lung abscess, foreign body, congenital cystic lung, hydatid disease, mitral stenosis, bronchial carcinoma and sarcoidosis emphasizes the problem.

Acute lobar pneumonia is common in tropical countries and is a major cause of death, especially in children. Evidence suggests that bacterial pneumonias are preceded by viral infections that presumably alter the susceptibility of the host or damages local defense mechanisms. The immune status of the individual also plays a key role, with HIV-infected individuals, autosplenectomised sicklers,

postsplenectomy patients, pregnant women, alcoholics, diabetics and malnourished all having an increased susceptibility to bacterial infection (44)

The symptoms of lobar pneumonia are well known but sometimes confusing. In early pneumonias the diagnosis may have to be deduced from the symptoms and presence of fever, shallow tachypnoea and the reduced chest movements, in the absence of any auscultatory signs. In one study in Africa it was however noted that the site of consolidation could be more reliably predicted by the 'pointing sign' than auscultation. The patients are asked to cough and point to the place where this causes pain. When pleurisy is diaphragmatic patient or physician may suspect an abdominal cause. In some populations a considerable number of patients with lobar pneumonia develop jaundice. This may be deep but usually fades with treatment of pneumonia (more rapidly than jaundice fades in acute viral hepatitis). (44).

Pneumococcal and *Haemophilus influenzae have* been the most common bacterial agents identified in most studies of lobar pneumonia. The organisms may be identified by blood culture in about a third of patients, or by detecting bacterial antigen in blood or urine. Direct needle aspiration from site of consolidation improves the yield but there is a small risk of pneumothorax (44).

Other causes of bacterial pneumonia may be difficult to distinguish from pneumococcal disease on the basis of clinical features. In legionella pneumonia, there may be mental confusion, diarrhoea or hypotension; hyponatremia and heamaturia are common. These features and failure to respond to initial antibiotic treatment, should indicate the possibility of this diagnosis, for which erythromycin is the drug of choice. The incidence of legionella pneumonia in the tropics is not well known but the propensity of the organism to multiply in water that is perpetually above 25 degrees centigrade, and the fact that about a third of UK patients have acquired the infection after travel in Southern Europe, suggests that

legionella may be responsible for more of the pneumonia occurring in the tropics than is generally recognised.

A proportion of pneumonias in any series prove to be due to *mycoplasma pneumoniae*, although these organisms more commonly cause a mild upper respiratory tract infection. The illness cannot be distinguished from other pneumonias by clinical features, but may be suspected in the small percentage of patients who develop extrapulmonary complications, especially arthritis or hemolytic anaemia. Tetracycline is the drug of choice but erythromycin is also effective. (44).

A severely ill patient may have *Staphylococcal* pneumonia, in which multiple lung cavities may develop. Many of these are assumed to be sputum negative tuberculosis and are given antituberculous drugs. The severity of illness and the presence of scattered, thin-walled cavities may alert the clinician to the correct diagnosis. Cloxacillin or a Cephalosporin may be appropriate treatment, or Chloramphenicol which is usually as effective and a lot less expensive.

It is important in areas where tuberculosis is common like Zambia, to remember that post-primary tuberculosis may present with a clinical syndrome indistinguishable from acute bacterial pneumonia. William Ossler recognised this when working in Boston in 1900, where tuberculosis was as common as it is in many tropical areas today. He taught that any patient with lobar pneumonia should be considered to have tuberculosis until clinical progress proves otherwise. This advice is still important today even when specific therapy is available. In some parts of Southeast Asia, meliodosis, caused by bacterium *Burkholderia pseudomallei* should be considered a possible cause of both acute and unresolving pneumonia, especially in the debilitated or immunocompromised.

Viral pneumonia cannot reliably be distinguished clinically from bacterial; the latter may complicate upper respiratory tract infections so that in both there may be

preceding malaise fever and upper respiratory tract symptoms. In children in particular most of the pneumonias do not require antibiotic prescriptions (46)

A diagnosis that may have to be considered in patients with cough and dyspnoea, especially in the context of malnutrition or any of the conditions associated with impaired immunity, is *Pneumocystis carinii.* This appears to be much less common a manifestation of AIDS in the tropics than is the case in North America or Europe (47).

There is no generally applicable standard treatment for pneumonia. Once the particular circumstances of an individuals' illness have been carefully assessed, a policy derived from local studies of etiological agents and drug sensitivity patterns should be applied. In some areas, particularly Papua New Guinea, Chloramphenicol was found to be effective as a routine treatment for children's pneumonia (48).

Whatever drug treatment is given, the patient should be carefully observed for response to treatment and for the development of any complications such as lung abscess, empyema, or metastasis (including cerebral) abscess (49).

HIV and Lung Disease

Pulmonary symptoms are common in AIDS, and in many patients they are the first clinical manifestation of the disease. The incidence of clinical tuberculosis is greatly increased in the presence of HIV infection. *Mycobacteria tuberculosis* is the most common respiratory HIV opportunistic infection in tropics. Pulmonary tuberculosis in HIV infected patients commonly presents as diffuse or milliary and basal in patients without HIV infection (49)

Extra-pulmonary tuberculosis is more common in patients with HIV disease than in those without (44).

P. carinii may complicate immunosuppression caused by HIV infection, but appears to be a less common opportunistic infection in the tropics than it is in the temperate countries. (47)

Kaposi's sarcoma and lymphoma may both present with pulmonary symptoms or with disease progression may involve the lungs. (50).

Although a variety of parasites cause lung problems in the tropics (see below), these infection do not appear to be increased in frequency or altered in their clinical manifestation by concomitant infection with HIV/AIDS. (44).

CHAPTER 3

AIMS AND OBJECTIVES

Main Objective:

To study the mortality trends in adults admitted to medical wards in the University Teaching Hospital in the last ten years

Specific Objectives:

1. To analysis mortality trends at the University Teaching Hospital in the last ten years.
2. To determine the top ten causes of mortality and see if there is any changes in the last ten years,
3. To make recommendation towards reducing mortality at the institution

The study will further attempt to answer specific questions:

1. Has the Health Reforms had any impact on mortality trends in the UTH?
2. Are any of the recorded mortalities preventable?

CHAPTER 4

RESEARCH METHODOLOGY

Duration: The approximate period of research is six months

Design: This is a retrospective study. Data was collected from the information center of UTH, which looked at the Admissions, discharges and deaths from 1990 to 1999 of the top eleven medical conditions.
A careful selection of files of the deceased for each disease condition were selected and thoroughly reviewed.

Data Entry: A standard data collection form was designed where all information was entered carefully.

Data Analysis: An epidemiological program EPI6 and Microsoft excel were used to analyse the data, with the help of a statistician. Care was taken to clean the data before analysis. Statistical packages were looked to determine significance.

Permission was sought from Managing Director of the UTH to access patient information, and was granted

CHAPTER 5

RESULTS

Summary Findings

Data was collected from the UTH information centre and from reviewing files of the deceased Information about total deaths; discharges and admission per year were collected for the period from 1990 to 1999. Two computer-based programs were used to analyse the data. These were Epi6 and Excel.

The first chart below shows the yearly trends of admissions, deaths and discharges in the UTH from 1990 to 1999.

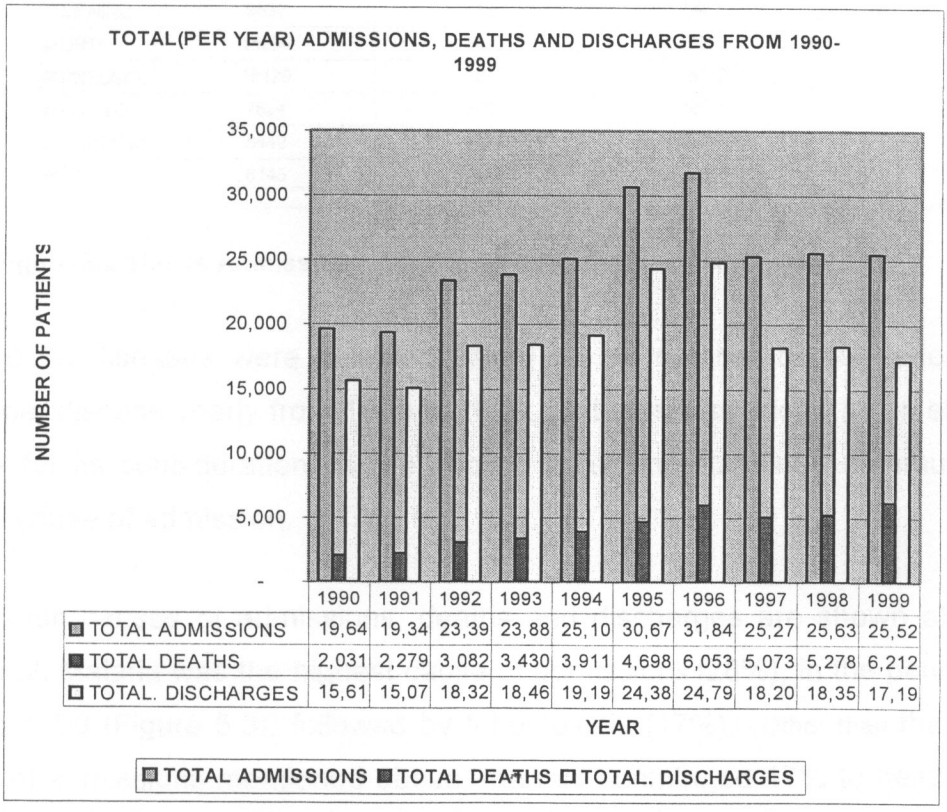
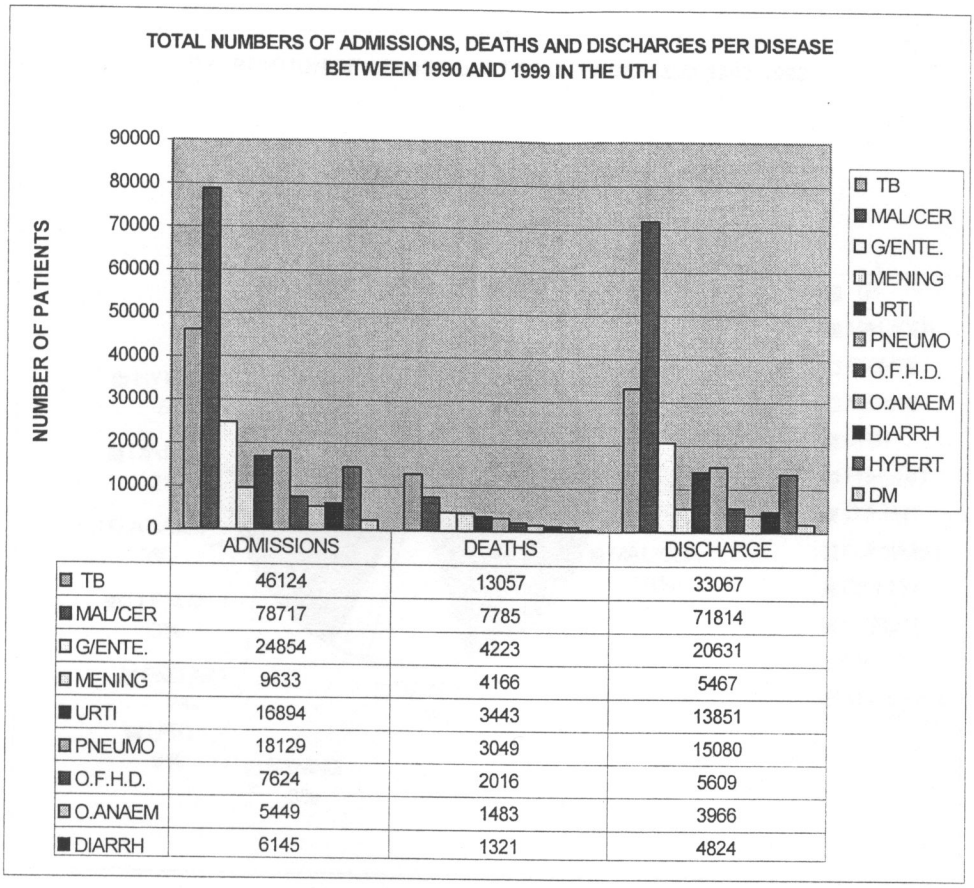


Figure 5.1 Shows trends of admissions, deaths and discharges in UTH from 1990 to 1999.



	ADMISSIONS	DEATHS	DISCHARGE
TB	46124	13057	33067
MAL/CER	78717	7785	71814
G/ENTE.	24854	4223	20631
MENING	9633	4166	5467
URTI	16894	3443	13851
PNEUMO	18129	3049	15080
O.F.H.D.	7624	2016	5609
O.ANAEM	5449	1483	3966
DIARRH	6145	1321	4824

Figure 5.2 Shows Admissions, Deaths, and Discharges per disease.

The Top 10 diseases were selected based on the number of admissions and deaths per disease yearly from 1990 to 1999. Diabetes was added as an eleventh disease for its consideration as the second most important non communicable disease cause of admission.

The top ten causes of admissions, deaths and discharges are shown above in Figure 5.2. Malaria was the highest cause of admissions (28%), in the period from 1990 to 1999 (Figure 5.3), followed by tuberculosis (17%). Other than the top 10 causes of admissions mentioned above, the rest contributed 17% to deaths, with diabetes contributing only 1%.

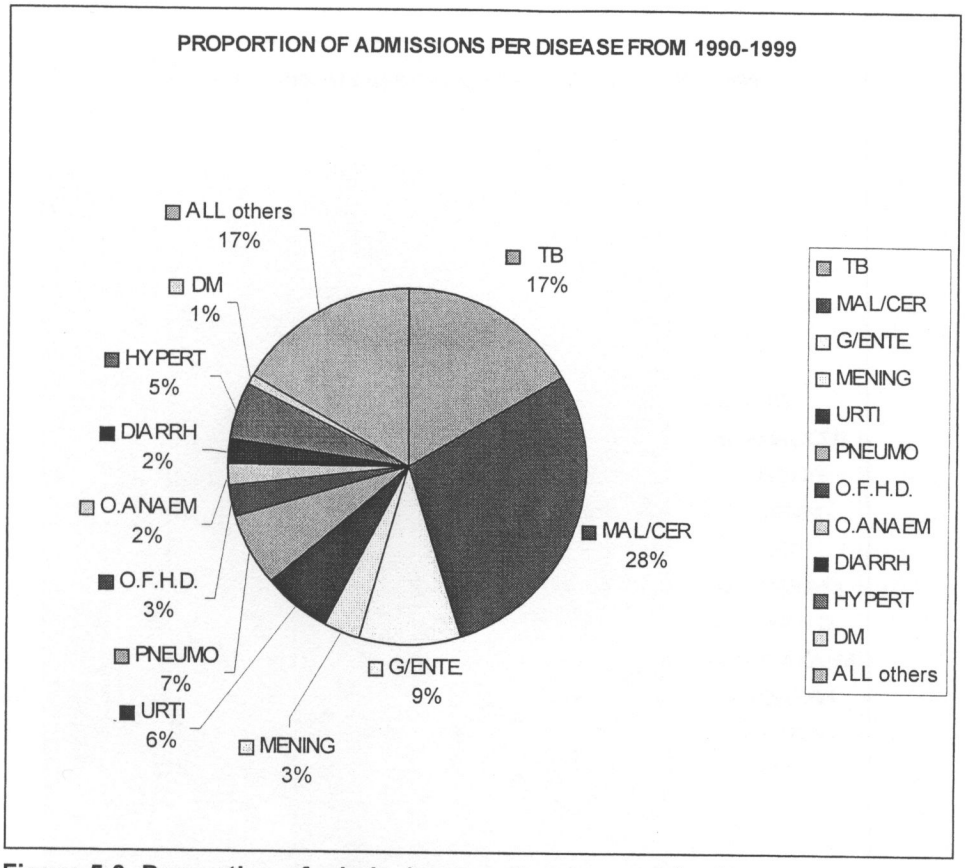


Figure 5.3. Proportion of admission per disease over the 10 years period under review.

Death rate calculations showed that Meningitis is the highest killer, followed by Tuberculosis. The least death rate was with Hypertension (Figure 5.4).

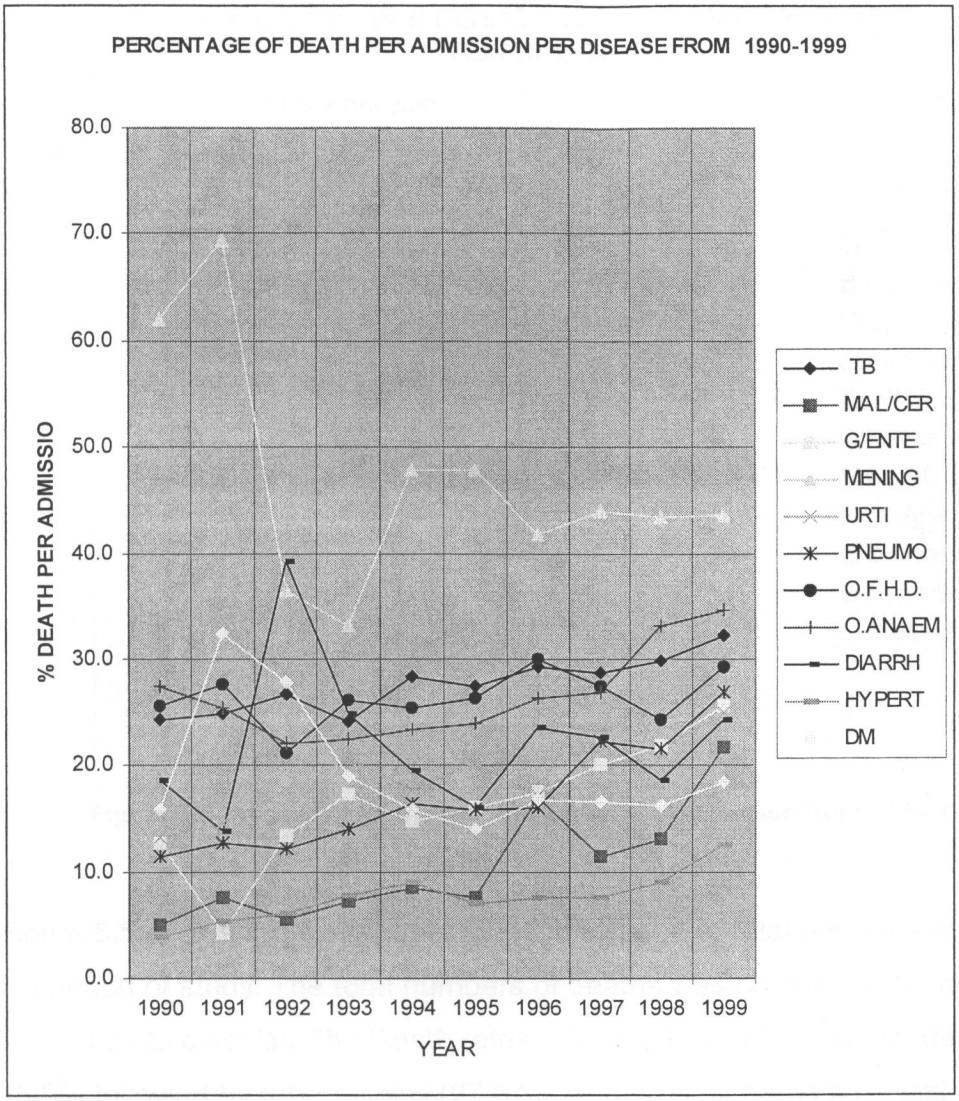


Figure 5.4. Shows percentage of deaths per admission (Rates) per disease.

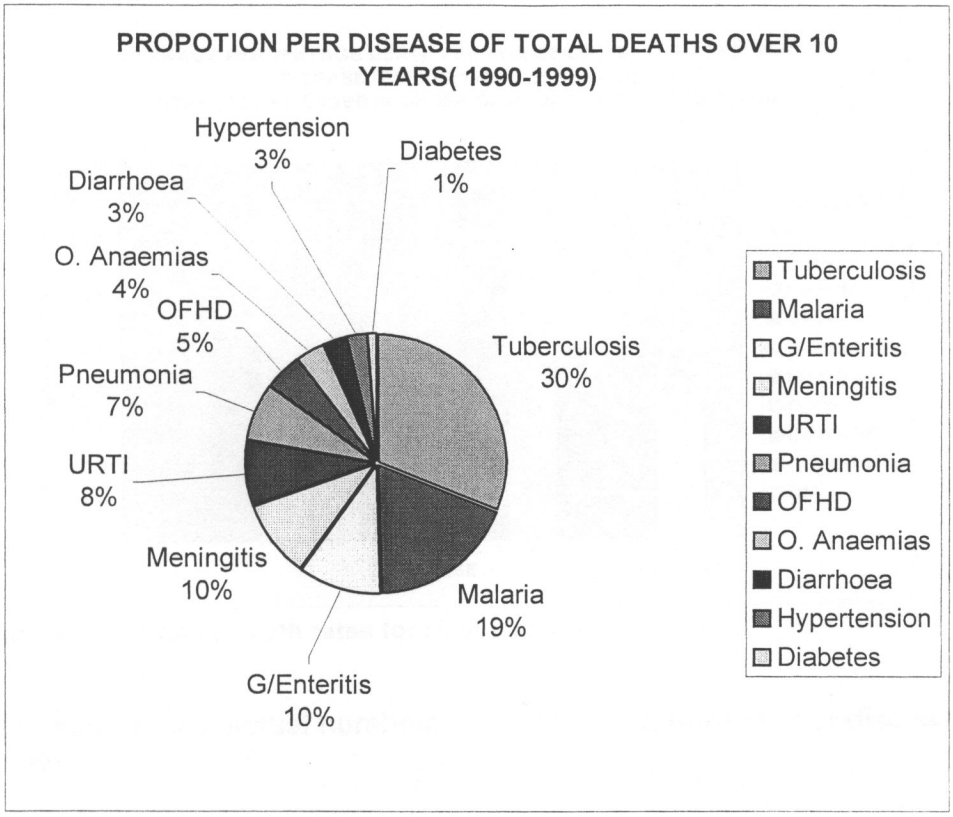


Figure 5.5 Proportion of deaths (in numbers) per disease from 1990-1999

Figure 5.5 shows the contribution of each disease to total numbers of death over the period of study. The total numbers of deaths was compared to the respective admission to calculate the Death rates. Meningitis had the highest death rate of 46.9% followed by tuberculosis (27.6 %). Hypertension had the least death rate at 7.6%, while malaria with 10.4 was second last (Figure 5.6).

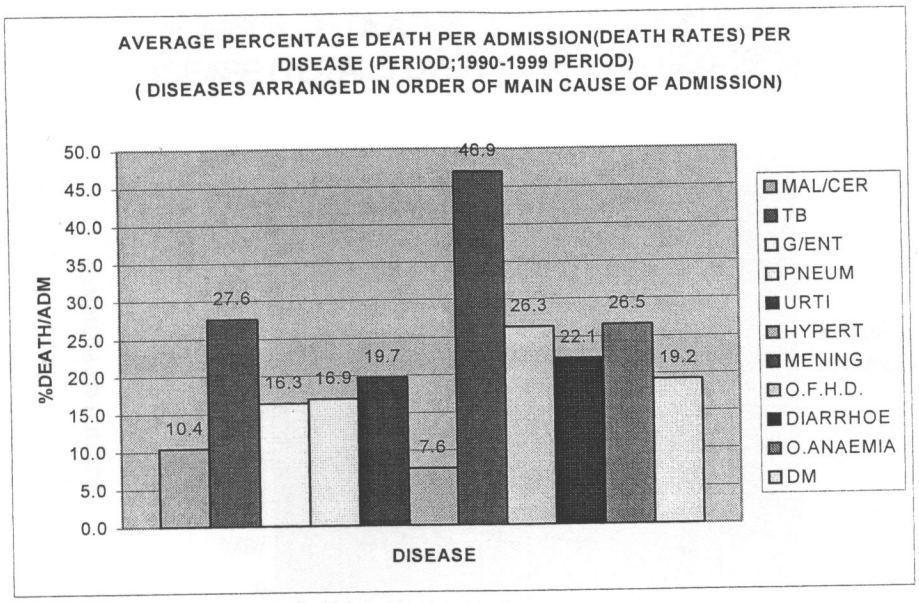


Figure 5.6a. Shows death rates for each disease.

The chart below shows actual numbers of deaths per admission per disease (Figure 5.6b)

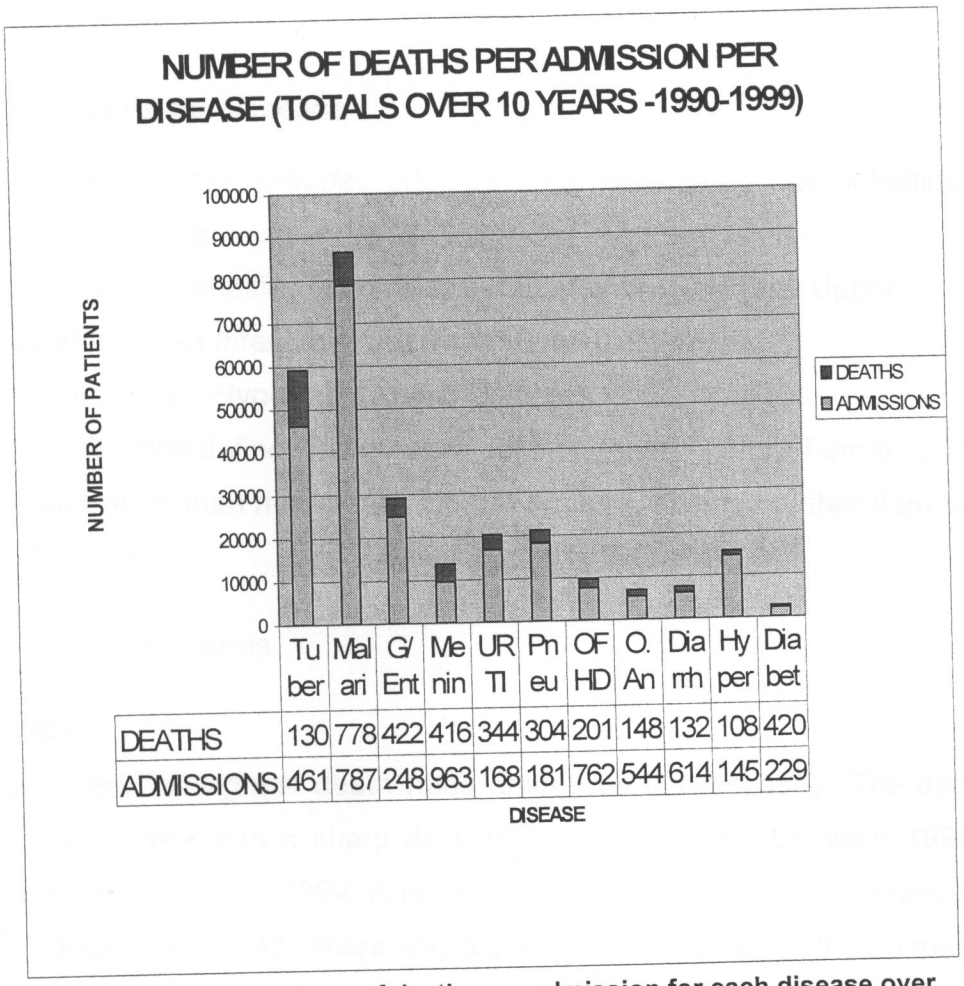


Figure 5.6b. Total numbers of deaths per admission for each disease over 10 years period.

Mortality Trends per Disease

The results have been grouped arbitrarily into three categories; infectious, non-infectious and others.

1. **Infections** - Meningitis, Tuberculosis Pneumonia, , Diarrhea Upper Respiratory Tract Infections and Gastro-enteritis, Malaria,
2. **Non-Infections** - Hypertension and Diabetes
3. **Others** - (poorly defined diagnosis at time of death) – Other Forms of Heart Disease (other than rheumatic), Other Forms of Anaemia (Other than Sickle cell disease).

'Infection' death Trends

Meningitis

Meningitis had the highest death rates among all the diseases. The death rate was 46.9%. There was a sharp decline in mortality rates between 1990-1993. This decline was 36 % in 1992. A further and lowest drop in the 10 years of study to 33 % happened in 1993. There was a plateaued increase of 15 % in mortality in 1994 and 1995. From 1996-1999 there was stabilisation of mortality at 43%, (Figure 5.7a and b).

Tuberculosis

Tuberculosis had the second highest death rate of between 25-32%. Over the ten years the general situation of tuberculosis neither improved nor got worse. However, mortality rates persistently increased even though by small margins (Figure 5.8a and b).

Diarrhoea

Diarrhoea was the fifth most important cause of death over the period from 1990-1999. The death rate was 22.1%. In 1990 the death rate was 19% and declined in the following year to 14%. It shot up by 15% with highest rise to 39% and recording the highest peak by the next year. The trend then dropped to a lowest

15% in 1995. There was then a fluctuation over the next four years to end at 25% in 1999.

Upper Respiratory Tract Infections

Upper Respiratory Tract Infections ranked as the sixth most important cause of death, with a death rate of 19.7%. Over the ten years period the death rates had continued to rise, with a different trend pattern from both pneumonia and tuberculosis.

Pneumonia

Pneumonia had an average death rate of 16.9%. It was the eighth most important cause of mortality in the UTH. There had been a steady rise in death rates over the years from 12% in 1990 to 26% in 1999.

Gastroenteritis

Gastroenteritis (Diarrhea and vomiting) had a death rate of 16.3%. It was the ninth cause of death. Diarrhea had an average death rate of 22.1%. In 1990, gastroenteritis had a death rate of 12%. There was a sudden drop in 1992 to 4%. There had however been a progressive rise from 14% (1994) to 25% in 1999.

Malaria/Cerebral Malaria

Malaria ranks as the tenths most important cause of death. It had one of the lowest death rates. It only beat hypertension. In 1990 death rates was at 5%. This low trend continued for the first five years until 1995. In 1996 it rose to 11% and continued to rise reaching a highest of 23 % mortality rate in 1999. the average death rate was 10.4%. It had the highest admissions accounting for 28% of all admissions.

Non-Infectious death Trends

Diabetes

Diabetes was the most important cause of death among the non-communicable diseases. It is the seventh most important cause of death , with adeath rate of 19.2 %. In 1991, the death rate for Diabetes was 15 % rising by 17% the following year to 32 %. This was followed by a gradual decrease over 4 years by 18% and then a slight increase in 1996. Mortality had stabilised from 1996 to 1999 at 17%.

Hypertension

Hypertension was the second most important cause of death among the non-communicable diseases. It is the eleventh cause of death. Thus, of the diseases under study, it had the lowest recorded death rate. There had been minimal but still steady rise from 8 % to 12% (1995-1999).

OTHERS

Other Anaemias

This group comprises those other than sickle cell anaemia. This group was the third most important cause of death, with an average death rate of 26.5%. The lowest recorded rate was 22% in 1992. The rate remained static for the subsequent three years. From 1996 there was a gradual increase of 26% to peak of 34% in 1999.

Other Forms of Heart Disease (OFHD) (other than Rheumatic)

These conditions exclude Rheumatic heart disease and include cardiomyopathy, hypertension, pericardial effusions, congenital etc. OFHD was the fourth most important cause of death. The average death rate was 26.3%. The trend started with 2.6 deaths per 10 admissions in 1990, and drops to lowest rates of 2.1 in 1992. It then rose over the subsequent four years to 3 per 10 admissions in 1996. This was then followed by a dip of 6% in 1998 and a similar subsequent rise in the subsequent year (1999) to nearly 3 deaths / 10 admissions.

TABLES AND FIGURES

Under this subsection tables and figures have been arranged in order of disease condition causing the highest mortality. Figures are placed just below their respective tables.

The order is as follows:

Meningitis

Tuberculosis

Other forms of heart disease (other than Rheumatic)

Other Anaemias (other than the one with obvious associated cause)

Pneumonia

Gastroenteritis

Upper Respiratory Tract Infections

Malaria (including Cerebral)

Diabetes and hypertension

MENINGITIS

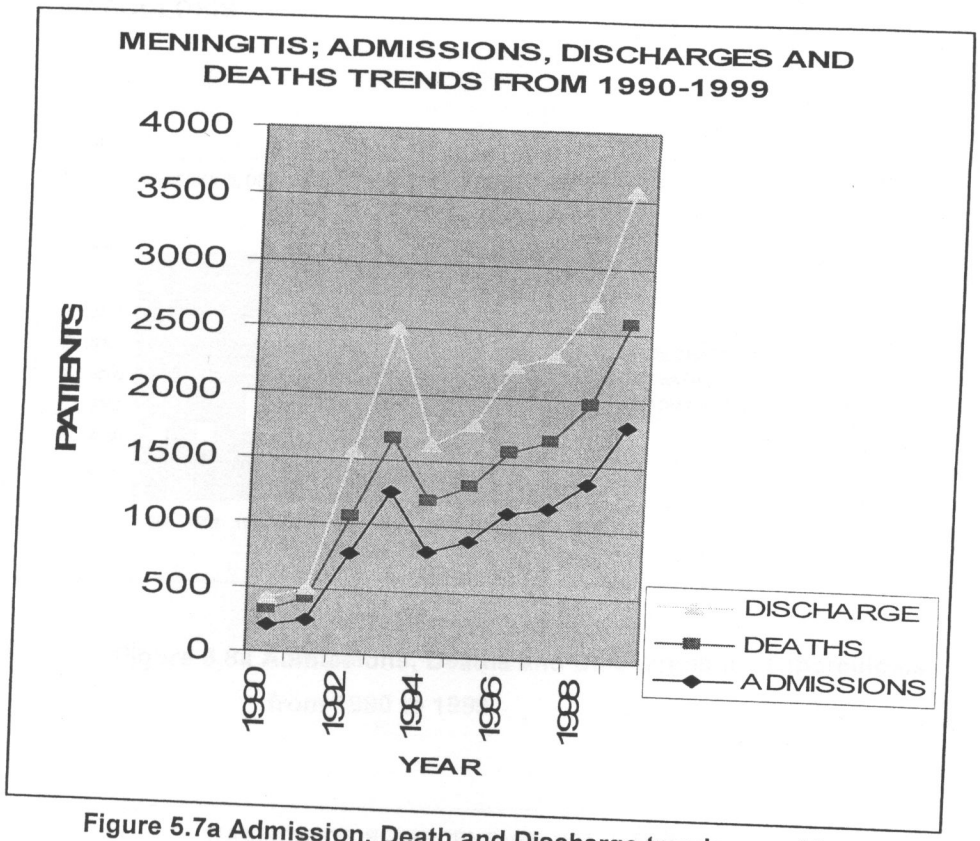


Figure 5.7a Admission, Death and Discharge trends over 10 years from 1990 to 1999

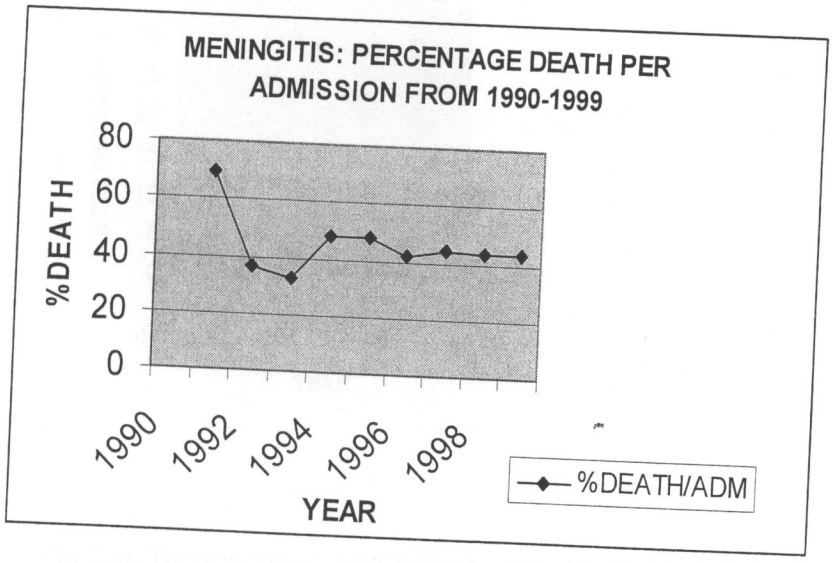


Fig 5.7b. Trends in Mortality Rates for Meningitis from 1990-1999

TUBERCULOSIS

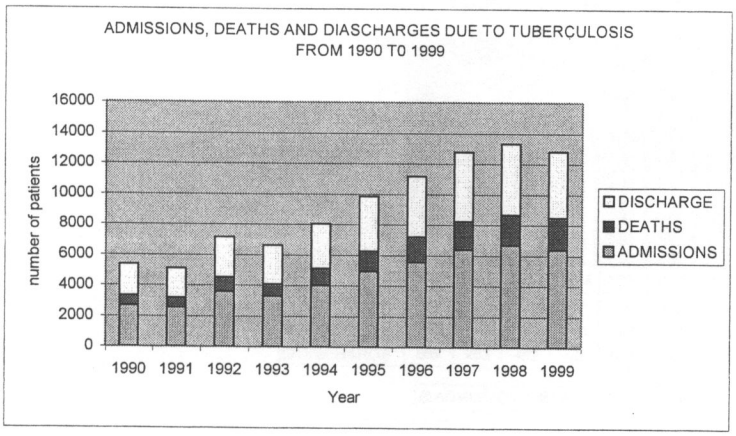


Figure 5.8a Admissions, Deaths and Discharges for Tuberculosis from 1990 to 1999

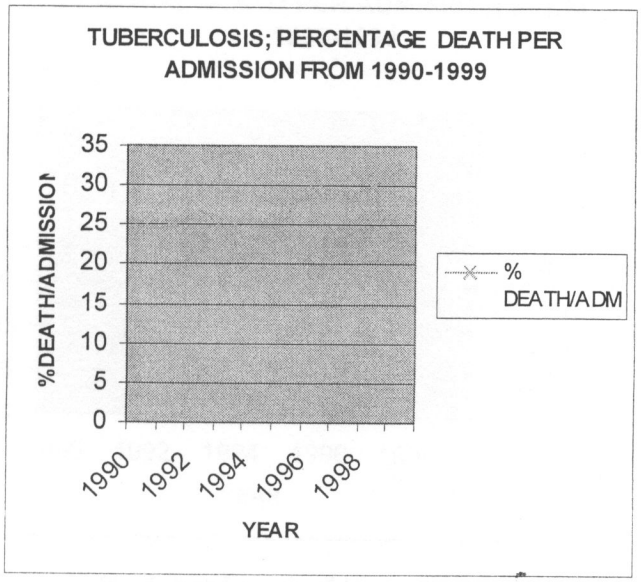


Fig 5.8b Tuberculosis; Percentage death per admission from 1990 to 1999 for Tuberculosis

OTHER FORMS OF HEART DISEASE (APART FROM RHEUMATIC)

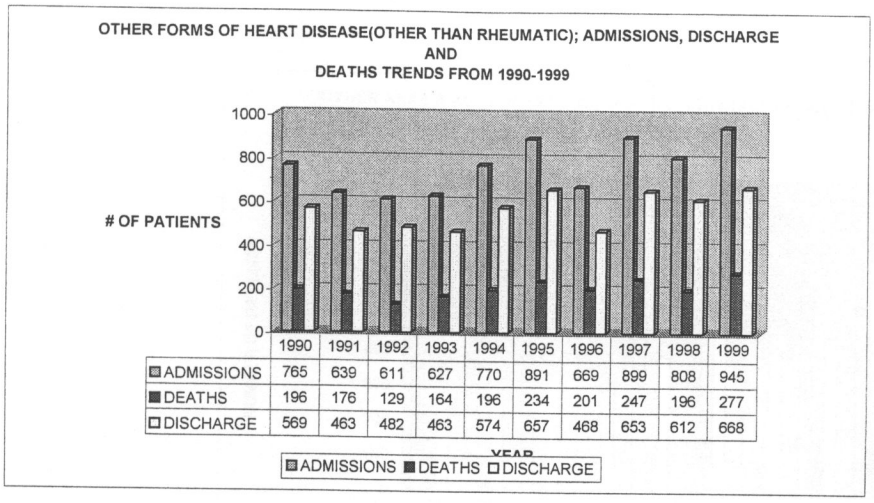


Figure 5.9a Other Forms of Heart Disease'; Admissions, Deaths and Discharges for 'from 1990-1999

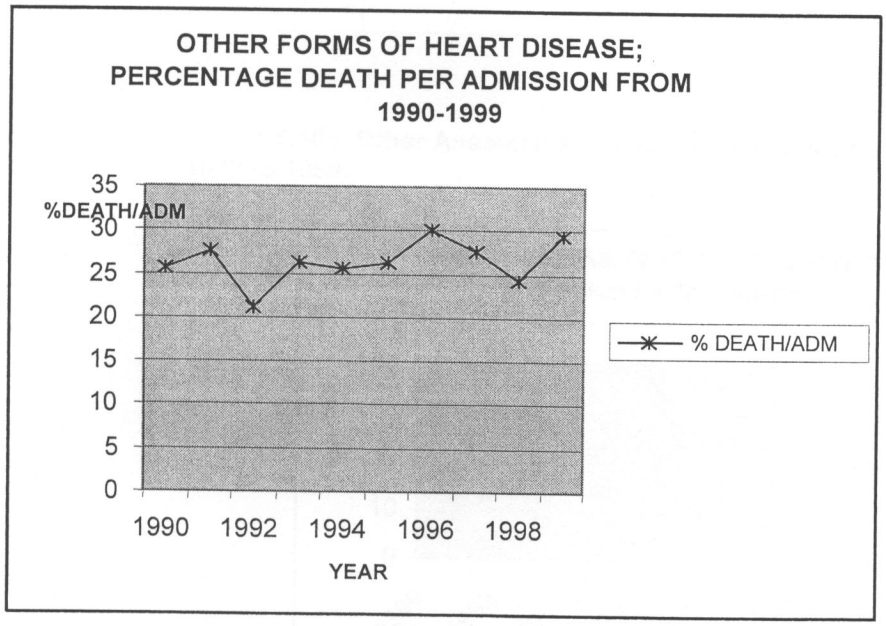


Figure 5.9b Other Forms of Heart Disease; Percentage deaths per Admission from 1990-1999

OTHER ANAEMIA (OTHER THAN THE ONE WITH OBVIOUS ASSOCIATED CAUSE AT TIME DEATH)

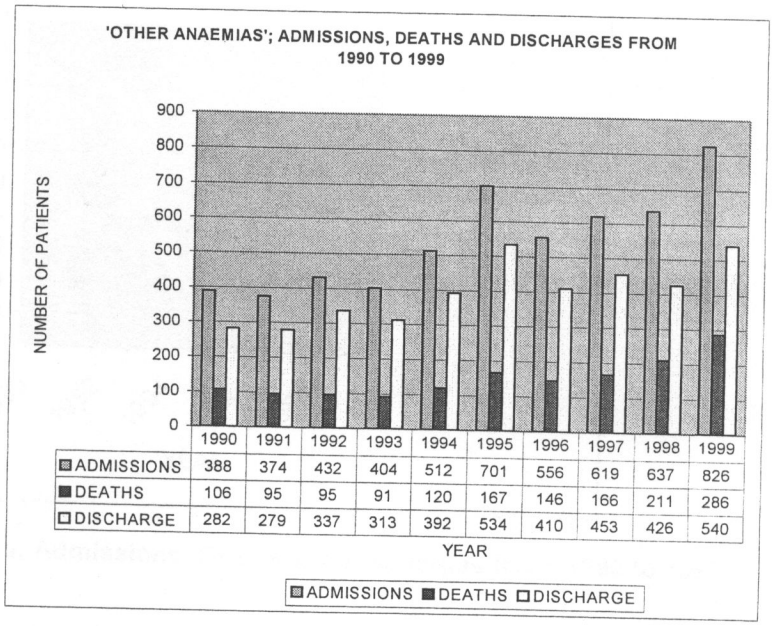


Figure 5.10a Other Anaemia; Admissions, Discharges and Deaths from 1990 to 1999.

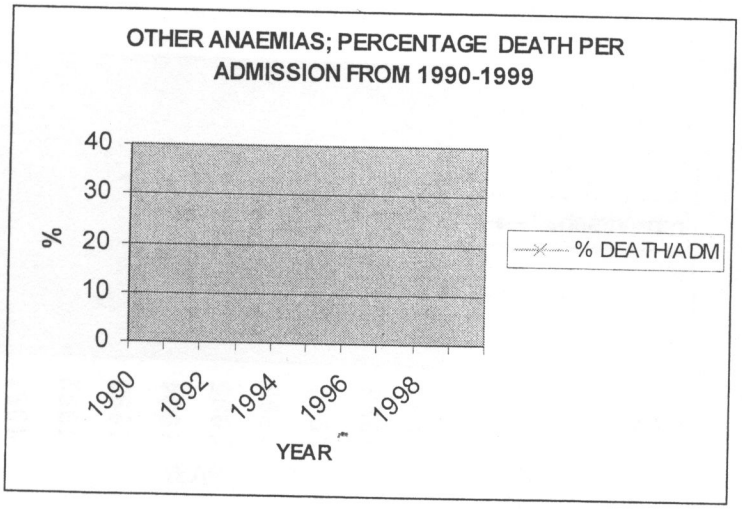


Fig 5.10b Other Anaemia; Percentage death per admission from 1990-1999

PNEUMONIA

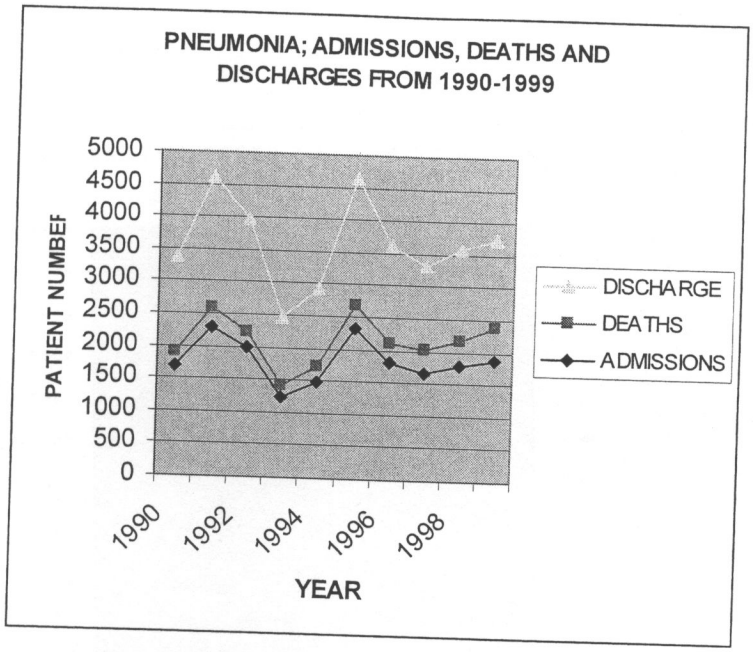


Fig 5.11a Pneumonia; Admissions, Deaths and Discharges from 1990 to 1999.

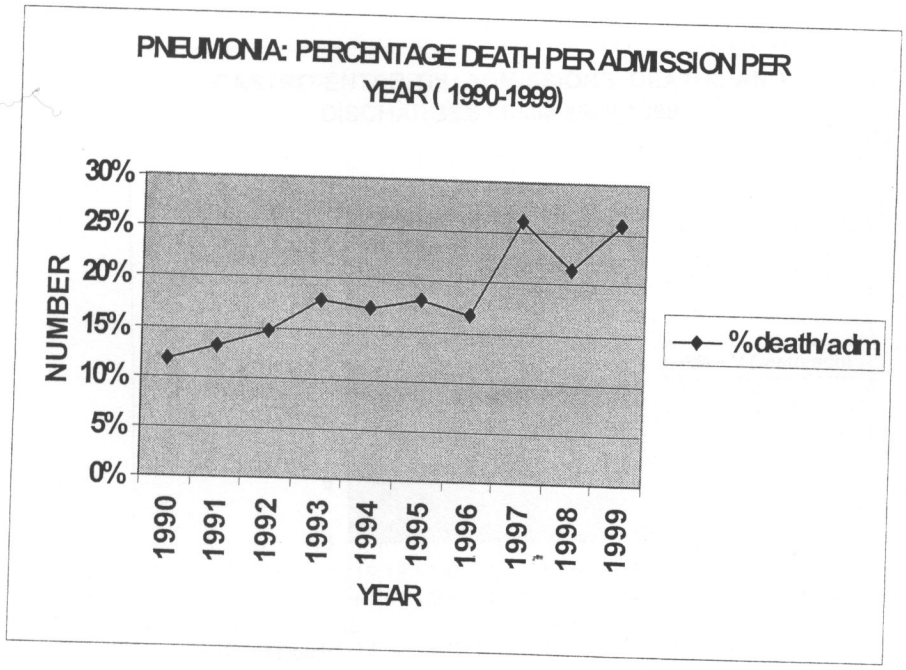


Fig. 5.11c Pneumonia; Deaths per admission for from 1990-1999

GASTROENTERITIS

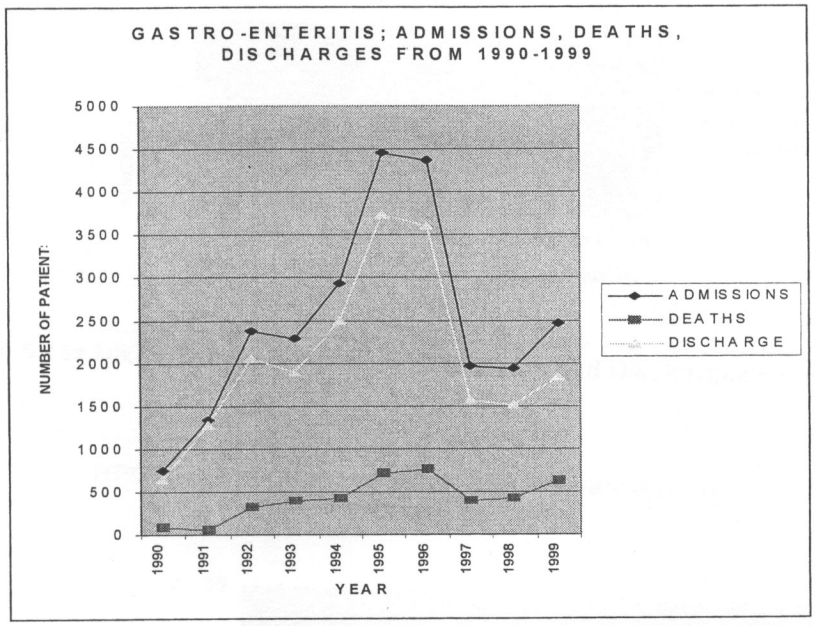


Fig 5.12a Gastroenteritis; Trends in Admissions, Deaths and Discharges from 1990-1999.

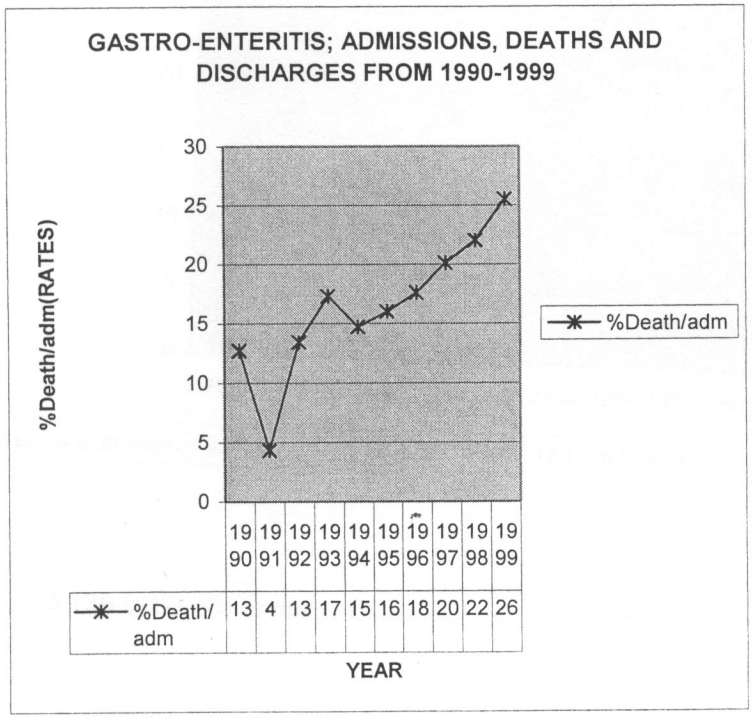


Fig.5.12b Gastroenteritis; death per admission from 1990 to 1999

UPPER RESPIRATORY TRACT INFECTIONS

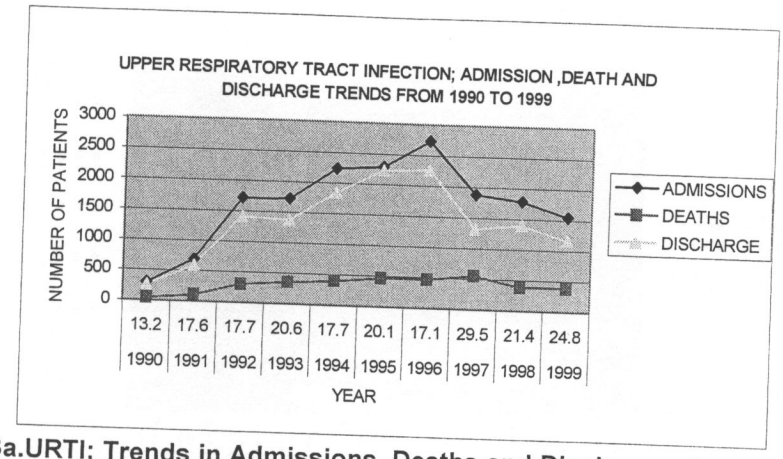


Figure 5.13a.URTI; Trends in Admissions, Deaths and Discharges from 1990 to 1999

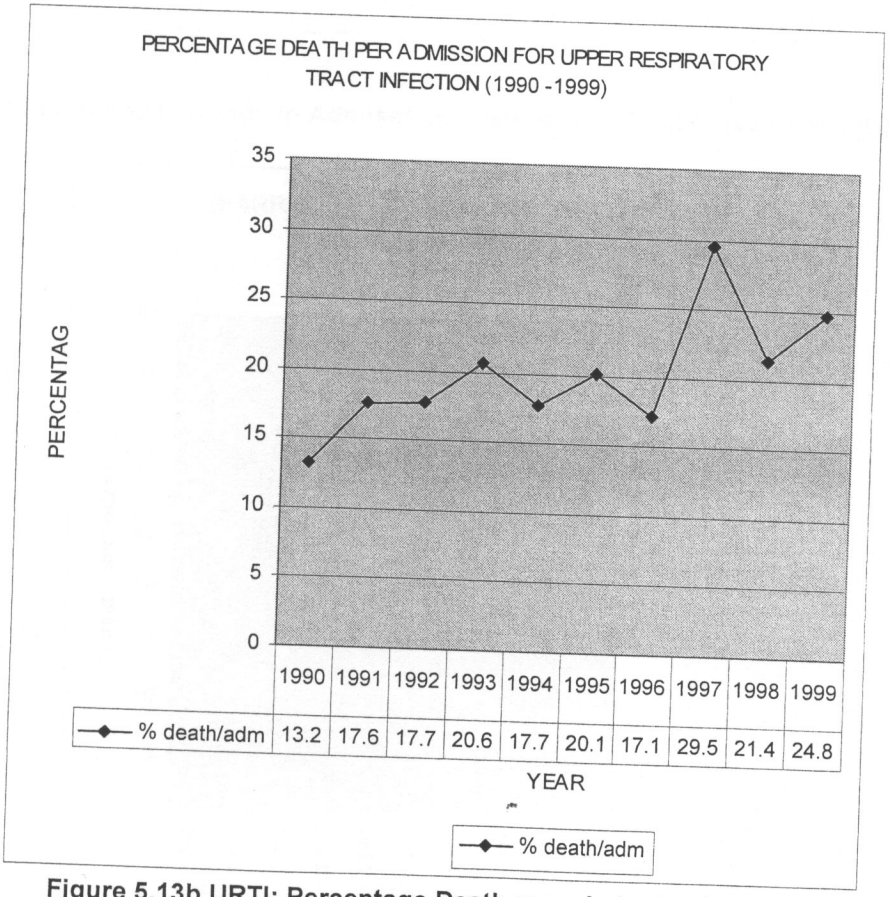


Figure 5.13b URTI; Percentage Death per admission from 1990 to 1999.

DIARRHOEA

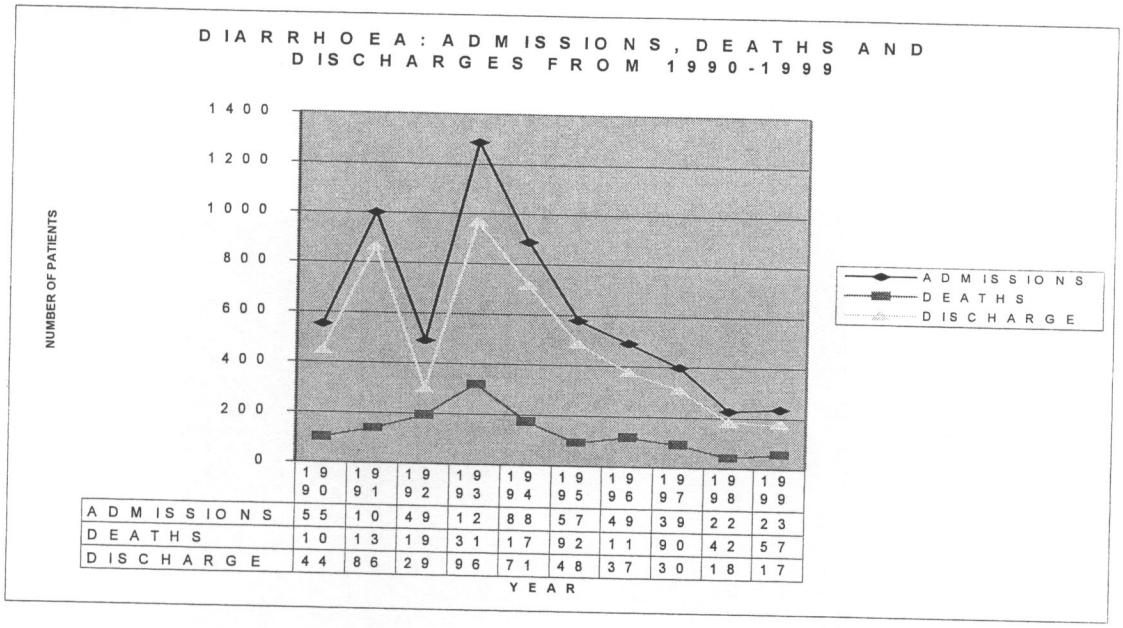


Figure 5.14a Diarheoa; Trends in Admissions, Deaths and Discharges from 1990 to 1999

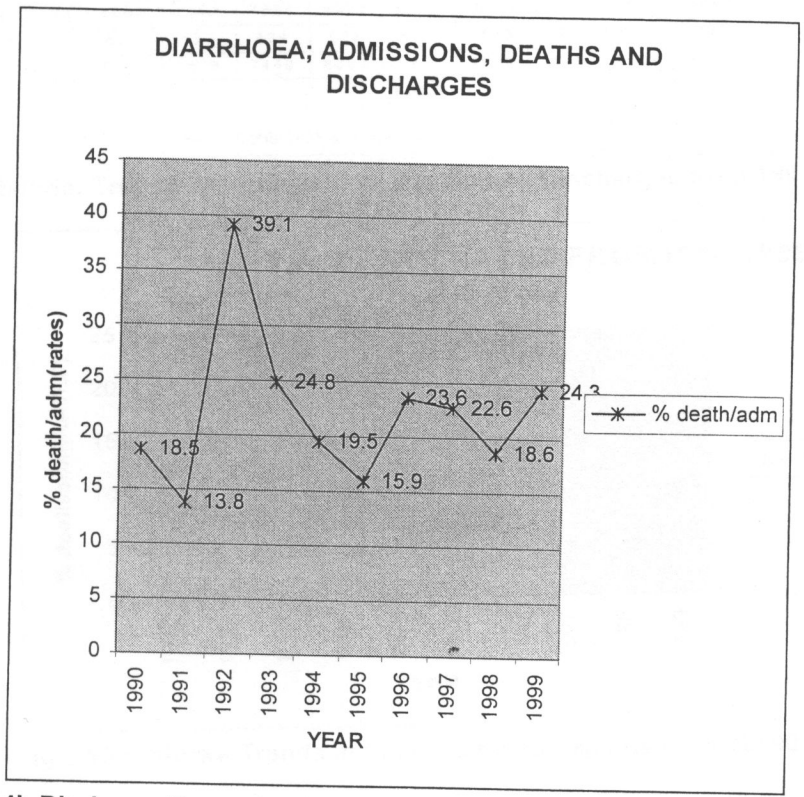


Fig.5.14b Diarhoea; Percentage deaths per admission from 1990-1999

MALARIA

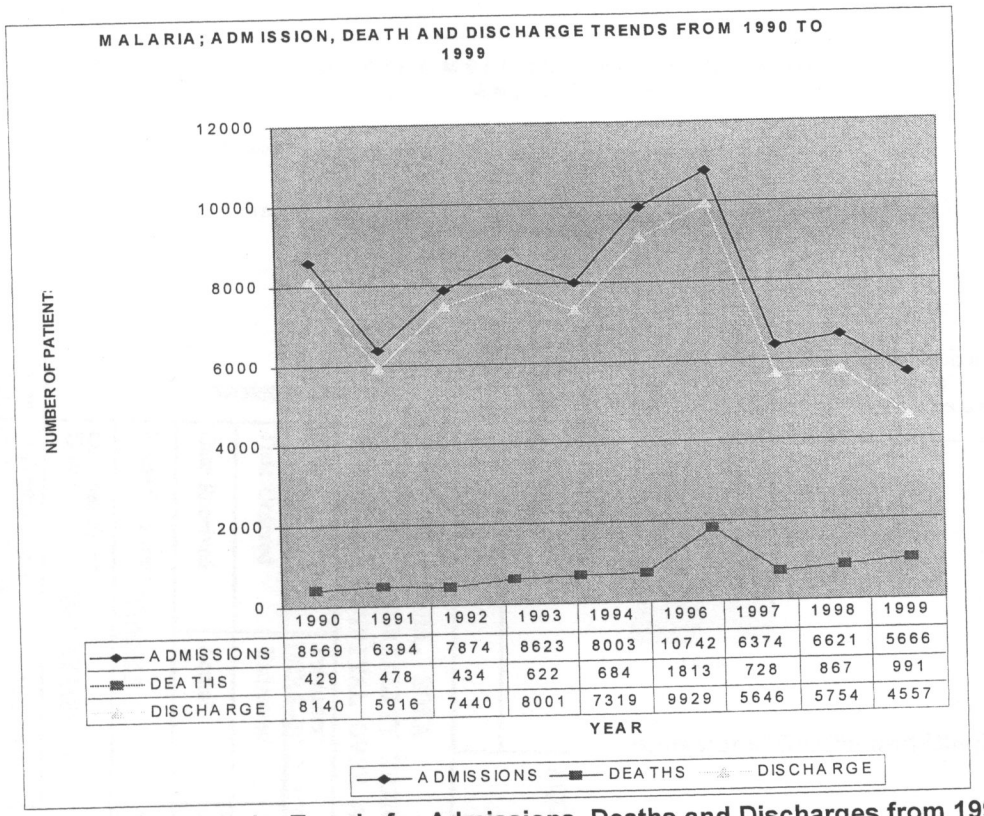


Figure 5.15a. Malaria; Trends for Admissions, Deaths and Discharges from 1990 to 999

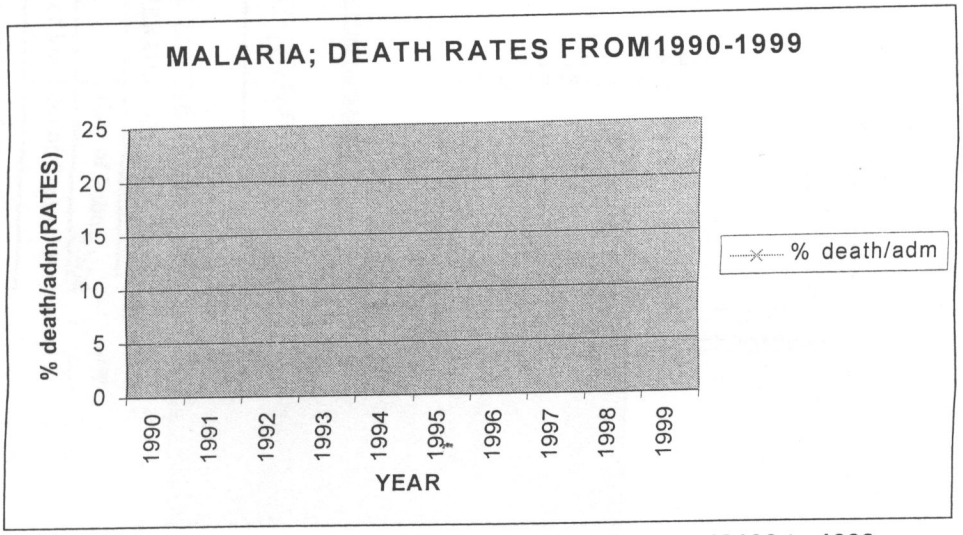


Fig 5.15b. Shows Trends in Death Rates for Malaria from 19190 to 1999

DIABETES

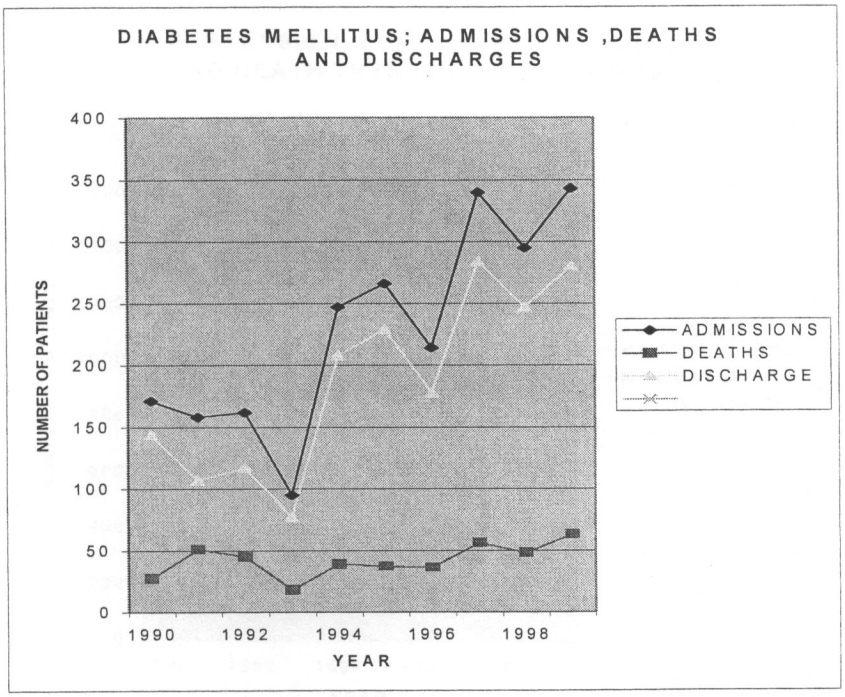


Fig.5.16a. Diabetes Mellitus; Trends in Admissions, Deaths and Discharges from 1990 to1999

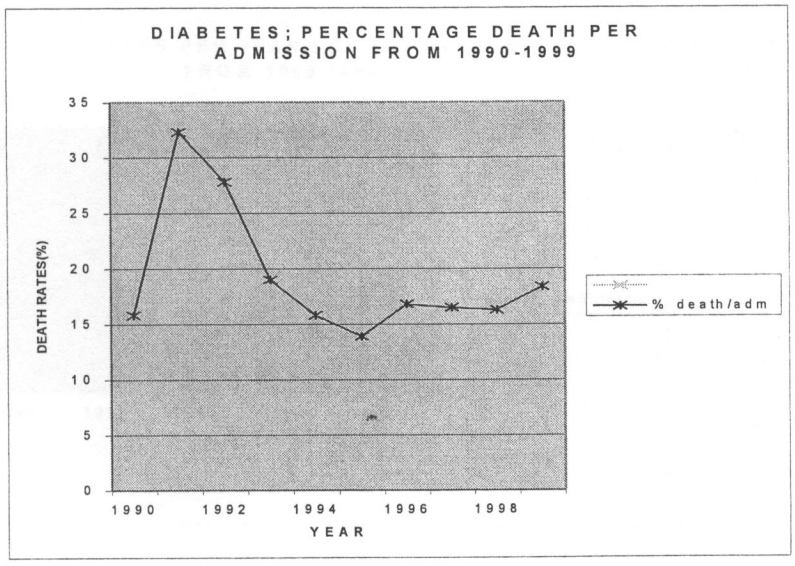


Fig 5.16b Diabetes Mellitus; Percentage deaths per admission from 1990 to 1999.

HYPERTENSION

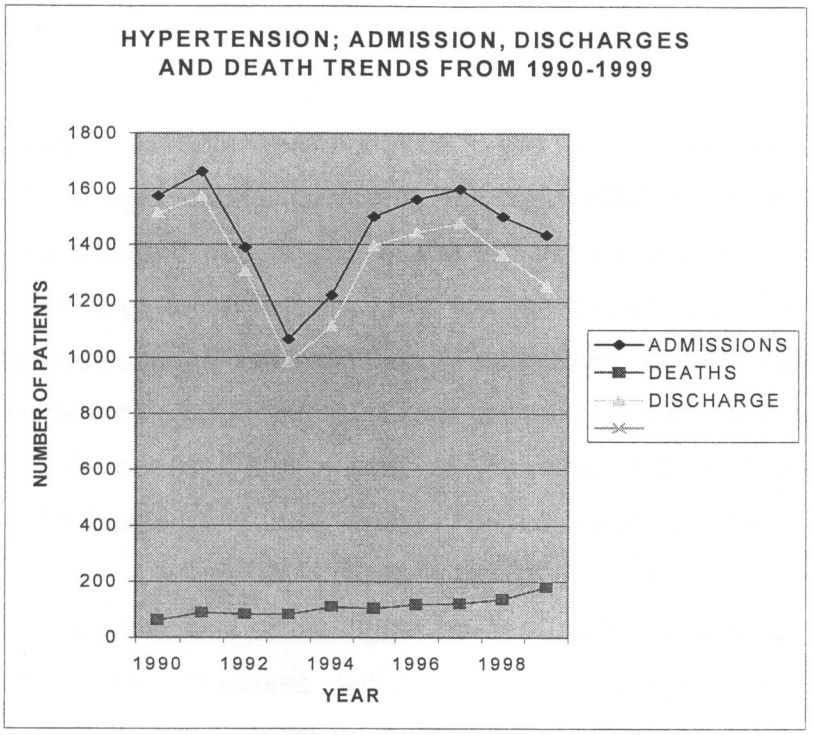


Figure 5.17a Hypertension; Trends in Admissions, Deaths and Discharges from 1990 to 1999

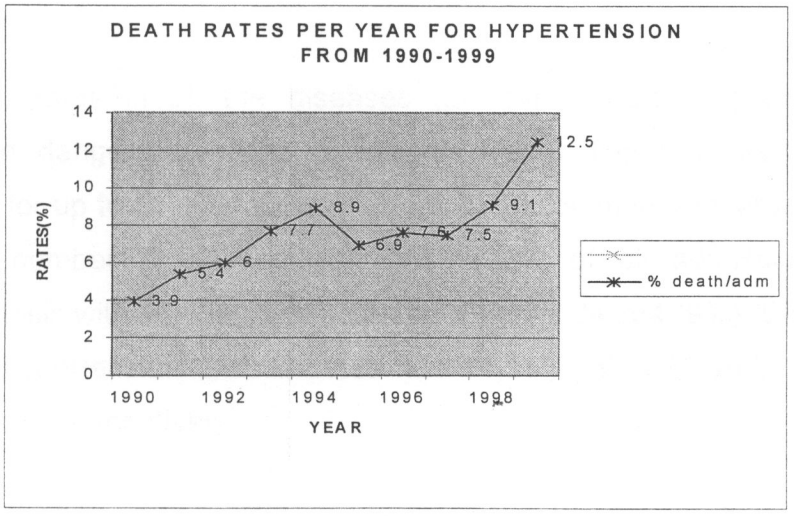


Fig 5.17b Hypertension; Percentage deaths per admission from 1990-1999

CHAPTER 6

DISCUSSION

A total of 276,621 patients were admitted to the Medical admission wards of the University Teaching Hospital between 1990 and 1999. Outs of these 230,378 patients were admitted due to one of the top ten causes of admissions, which account for 81 % of all admissions. The top ten causes are of admission were, Malaria, Tuberculosis, Gastro-enteritis, Pneumonia, Upper Respiratory Tract Infection, Hypertension Meningitis, Other forms of Heart Disease (other than Rheumatic) Diarrhoea, Other forms of Anaemia (other than those which associated with Sickle Cell Anaemia and known disease condition), Diabetes.

Diseases due to Infections are a bigger burden (both admissions and deaths) to this institution than Diseases without an infectious cause (Diabetes and Hypertension). They account for up to 80 % admissions, are attributed to in one way or another to an infectious cause. Infections are also responsible for a significant proportion of deaths in Diabetic patients.

Mortality rates in all the diseases are either increasing (majority) or have remained dangerously high (meningitis 47%). Top ten causes of admission account for up to 81 % of all admissions in adults' medical wards. Malaria has the highest number of admissions; 78,717(28% of all admissions) followed by Tuberculosis with 46,124 (17%), Gastro-enteritis 24,854 (9%). Disease of life style namely hypertension and diabetes has 14,518 (19.6 %) and 2,291 (1 %) of all admissions, respectively.

In all the diseases, death is on the increase over the ten years. In terms of numbers Tuberculosis has claimed 13,057 lives Malaria has claimed 7,785.

Gastro-enteritis claimed 4,223 lives. Hypertension caused 1,084 deaths, while Diabetes claimed 420 lives.

However, deaths per admission shows a different picture when compared to absolute numbers. Meningitis, which is not even on the top five diseases, which cause admissions, has the highest death rate. Up to 47% of admission results in death. This is followed by Tuberculosis where 28 % of admission of tuberculosis dies. Diabetes has a death rate of 19.2 % while malaria has a rate of 10.4%. Up to 7.5 % of admissions die from disease conditions related to hypertension.

Factors contributing to high morbidity and mortality can be grouped as *patient-related, service-provider related,* or *National;*

Patient related

Majority of patient referred to UTH are either very ill or are terminally ill. One reason being that they are brought to the UTH, from both periurban and the private sector, as the last resort. Another reason for bringing patient late might be because of little knowledge about the disease on the part of the patient and relatives about the seriousness of the disease.

As mentioned, the economy had continued getting worse year after year with soaring unemployment (2). Money hence became difficult to come by. Patient and their relatives may thus have little or no means to come or bring the patient to hospital. Yet another reason is their ignorance of the services provided, e.g. the thought that services provided might be expensive deters patients from coming.

Frequent shortages of medicines and other basic medical surgical supplies (7) also has made patient lose confidence and trust in the institution, hence they are bring patient to die. The mere fact that death rates are high, because of the

already mentioned reasons above, also gives a negative picture about the institution, and so patients' confidence is further eroded.

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Service-related

The University Teaching Hospital has numerous problems, which contribute to the morbidity and mortality. The institution is overcrowded (13) (14). This has brought stretch on the medications, and staff, as it goes beyond the capacity and budget. There has also been continued decline in total number of all types of staff, ranging from medical doctors to paramedics. Staff members continuously leaving for greener pastures or are dying (51).

Over the period of study, the UTH has been unable to meet its budget need. The main source of funds is the Central board of Health/Ministry of health. These institutions have had a series of their own problems (13) (14),that have directly resulted in under funding of the UTH. What is worse is while the CBOH has continued to cut the monies given to UTH, the economy has continued to perform poorly and he prices of almost all surgical medical supplied have continued to rise. Revenues from the patients collected are not enough to meet the institutions basic needs. How these monies are spent /planned for is another area to be studied. Other than these two sources, the UTH does not generate other monies from business ventures.

Patients stay longer in hospital than expected. This is because of a number of reasons. Firstly some patients they come with advanced/ complicated diseases, there seems to be a direct link with HIV/AIDS. The institution has not yet established protocols to discharge patients to home care, hence they stay longer. From time to time, essential drugs for a particular condition (e.g. Intravenous X-pen for bacterial meningitis) may not be constantly available hence prolonging stay.

The laboratory has also been affected with the reduced funding to the institution. This has resulted in incomplete investigations of patient's conditions hence doctors hesitate to discharge, resulting in prolonged stay in hospital and continued use of hospital facilities. The quality of results may also be affected because of little funding.

Once death has occurred, clerks enter the data, using the CD10 classification of death. It only concentrates on statistics of the pause of death. The clerks write the first impression the medial officer wrote. Unfortunately, the first impression is not always the final cause of death. And secondly, a lot of files showed that doctors do not even write down their impression. This leaves the non-medical clerks to make a 'sensible guess'. One weakness of this classification is its failure to identify more than one disease condition in a one patient.

Up to date, the data from patients' files is entered on papers. The section is not computerised. This brings s in a lot of paper work and hence data may be lost. The institution is not fully utilised this section for projections and planning of the institution.

File handling leaves much to be desired. Firstly, a good number of files get lost. The result is patients have incomplete files hence not all information is there in case a file review was required. Most doctors only provide scanty information. Some do not even write the diagnosis, not even a provisional one. The reviewer of files, if is a medical worker, will have at to make out what the diagnosis might have been. The inaccuracies, which ensue, cannot be further stressed. It is even worse for non-medical reviewers. It was also noted that even some diagnoses of by junior medical staff left much to be desired in some cases, especially those to do with meningitis and encephalitides.

Related to National issues

The disease burden in the country is high, especially with the high rates of ignorance, illegal squatters, and the continued worsening economy. Hence the disease pressure results in more admission affecting almost all health providers.

Controllable non-infectious diseases like Diabetes and hypertension, which have continued to claim lives are getting worse, but are being ignored and overshadowed by infections.

HIV/AIDS rates are very high in the country (about 19%). It has contributed to the higher death rates especially in infectious diseases. Its real estimate is difficult because, firstly HIV testing is not compulsory among admitted individuals, neither is AIDS per se a complaint by patients. And Secondly, it is not a direct cause of death, hence not written in many files or death records. It has lead to prolonged admission to the hospital.

Over the period of study, there was the highest turnover of political leadership at the Ministry. All the Ministers came from different backgrounds. The first Minister had a social and public health back ground, and was in office for about two years. The second Minister had a paramedical background with strong biases towards HIV/AIDS. The consequent ministers were pure either pure politicians with no medical background or accountants and engineers.

This turn-over resulted with different visions affected, though not quantifiable, the health reform process and the funding to the institution. Almost all the Ministers selected their own leadership at the university teaching hospital. This, in itself does not only suggest severe political influence, but also that each ministers personal; interests were taken into consideration. Needless to say, each minister's tenure was marred by strikes by medical and paramedical staffs, which was complaining of, shortages in the hospital and poor conditions of service.

COMMUNICABLE DISEASES

MENINGITIS

Meningitis stands out to have the highest death per admission rate. Have up to 50:50 chance of dying. The rates are abnormally high. In 1990 6 out of 10 meningitis patients died. In 1991 7 out of every 10 patients with meningitis died. However in the consequent 2 years, there was a big slump to as low as 33%, the lowest ever recorded. From there on, the rate rose to 48 % and consequently stabilising at about 44 %.

The period before 1991 is the time when health reforms were not yet in effect. Most clinics and other health institutions were referring almost all cases with suspected central nervous involvement. This was so because the peri-urban clinics did not have admission facilities at that time, and neither were there criteria for transfer. Also there was erratic and misdistribution or medical and surgical supplies and understaffing. Nurses were seeing most patients. Another reason is that since, health reforms planning was still going on, shortages of health surgical medical supplies affected most clinics. Thus, patient s were sent or decided on their own to come to the University Teaching Hospital with hope to seeking further or better treatment.

Health reforms were eventually introduced in 1991-1992. Treatment Guidelines were put in place. Peri-urban clinics were well funded and stocked with necessary diagnostic facilities. In fact, at that time since it was assumed that UTH would be a tertiary hospital, funding to the hospital was reduced was reduced to accommodate only complicated cases. Thus the overall improvement in patient care of referring institutions resulted in the sudden slump seen in death rates. In other words only 'genuine' cases were referred.

Within 2 years after the introduction of the reforms, the death rates increased by 10 percent, and consequently stabilised over years at about 44 %. The total

number of admissions has continuously increased year after year from 800 in 1994 to 1800 deaths in 1999 alone. This works out to 150 patients per month or 5 deaths per 11 admissions per day.

Admissions due to meningitis continue to rise year after year. This is associated with a progressive widening of the gap between admissions and discharges. In other words higher numbers of admissions were associated with lesser discharges or more deaths.

Funding to the institution; Indeed the institution funding had continued to dwindle over the past few years while the number of patients suffering from Meningitis continued to rise, not to mention other diseases. To make matters worse, there had been progressive reduction in the total numbers of medical staff (doctors, nurses and paramedics) who have left for greener pastures. This meant was that the few remaining staff is overburdened and efficiency in patient care reduced. This is indeed evidenced by the widening of the gap in the graph between admissions and discharges.

176 files were selected for review. These files were among the ones where the diagnosis of meningitis was made, either on admission or discharge. What was interesting was that 37% of patients had encephalopathy, that is, abnormal behaviour with or without altered level of consciousness, with or without a fever or confused behavior.

Disease factors might also explain the worsening situation of meningitis. It is possible that patients are brought to the hospital when the disease process is too advanced. One possible reason would be the progressive or worsening of the economy over the period of study. The government introduced public sector reforms and this sent many people on the streets, worsening the unemployment situation. Further more a huge group of citizen's directly or indirectly relied on the copper mines. Almost all mines shut down in early 90's. The overall end results

were the tumbling of economic indicators and hence up to 80 % of Zambians started living below the poverty datum line. Thus relatives or spouses to patients could no longer afford basics and possibly did not have money to bring patient to hospital on time. Even after being brought to hospital, relatives could have failed to buy required medications.

If we make a presumption that the health reforms were indeed working well, including the referral systems. It means that true severe / complicated cases were the ones referred to the UTH, and thus making likelihood of death higher.

The aetiological agent of meningitis is another contribution factor to the high mortality. Up to 50 percent of the CSF sent to the lab show no organism i.e. no bacterial organism isolated, and biochemistry (total protein and sugar) is essentially normal. Of these, 68 percent die before an infectious agent can be isolated. This strongly suggests non-bacterial cause of meningitis (fungal, viral parasitic or maybe even mycobacterium). Thus in some cases the patient may have encephalitis or meningoencephalitis. The routine practice is to start intravenous antibiotics on all patients with meningitis. With these findings, there should be changes to our management of meningitis patients.

So far, the available information from the laboratory shows *Cryptococcal Neoformans* as the commonest isolated pathogen from the CSF. This accounts for up to 37% of all causes of meningitis. Streptococcus is in very few cases This might suggest since the aetiological agents are not known in up to 50% of cases of meningitis, that treatment is either indeed blind or wrong all together. Majority of these patients are put on X-pen and Chloramphenicol for probably no purpose. Of course not treating bacterial meningitis would be unacceptable.

Isolation of *Cryptococcal Neoformans* from CSF in itself undoubtedly brings in HIV as a big underlying problem in our meningitis. The reliability of our laboratory might be questionable to some extent, though the in-charge seems to say that

they have capable staff and adequate reagents not to compromise on quality. Yet another possibility is that CSF handling is not good. Duration from wards up to the laboratory and also waiting on the bench might affect the isolation of organisms. This might be worsened especially over the weekend.

Host factors are another possibility to increasing in the death rate. As mentioned majorities (80%) of Zambian people are poor people. This directly or indirectly leads to malnutrition and consequently poor defence system. Compounded with the shanty compound (high burden of ignorance and disease) with the up to 20 % AIDS rate, the hosts defence system is compromised, making it vulnerable to infectious agents like cryptococcus.

The persistent negative publicity about the institution over the decade has resulted in people shunning away from bringing patients to the institution. Those who are brought in are the terminally ill patient or complicated cases or very advanced cases. In other words, it is used as a dispatch bay. All clinics including the public sector end up sending their dying patient to the UTH, hence making mortality really high.

A possibility of underreporting of information is also there, for example in cases where there is a co-morbid condition e.g. Diabetes with Meningitis, records will be entered as diabetes, Or where the doctor has written meningitis as one of the problems, the clerks might just not write the diagnosis, though this is a small. Not all doctors write the diagnosis on admission or during the hospitalisation. Furthermore the diagnosis might change while patient is in hospital. The immediate cause of death as well in rarely, if ever, written at the time of death.

Meningitis is the most important cause of death in the UTH amidst much discussion. Solutions must be found to control this disease condition.

TUBERCULOSIS

A total of 46,124 patients were admitted between 1990 and 1999 with the diagnosis of tuberculosis. By far the majority is pulmonary tuberculosis. TB accounts for 19% of all admissions to the adult medical wards of the University Teaching Hospital. It is the second most important cause of admissions.

Of the 46,124 admitted 13, 057 died, making it 25-32% deaths of admissions. This high death rate makes tuberculosis the second highest cause of death in the medical admissions ward. Over the ten years of the study, the situation is neither improving nor getting worse. However, mortality rates are persistent and increasing even though by small margins.

In 1990 there were 2,691 admissions due to tuberculosis followed by a small drop to 2,555 in 1991. This was the lowest number of admissions. From 1992 there has been a progressive increase in numbers of admissions from 3,302 in 1993 to 5,584 in 1996, with the highest at 6, 669 in 1998. There was a slight decline to 6, 408 in 1999.

As regards mortality there has been progressive increase in numbers of people dying from the disease. In 1990, 654 died and since then, there has been progressive increase in numbers. In 1993 there were 797 deaths, rising to 1,631 in 1996 and finally to 2,064 in1999.

Tuberculosis is the second highest cause of deaths per admission, second only to Meningitis. There has also been a progressive increase in percentage of death per admission. Out of a total of 46, 124 admissions, 13,057 died over a period of ten years. This means up to 27.6 % of admissions, on average, died per year. In 1990, 24.3 % died. This percentage has progressively risen. In 1993 24.1% died. By 1996 it had rose to 29.2% and to 32.3% in 1999.

The diagnosis of tuberculosis is ideally supposed to be based on sputum. However some of the tuberculosis diagnosis is based on radiological and clinical findings. The proportion of patients being started on Anti Tuberculosis Therapy (ATT) is increasing day after day because of several of reason. Firstly the total cases of tuberculosis has increased partly due to AIDS and poverty. Secondly there are limited facilities to fully investigate other causes of chronic cough, such as fungal infection, whose prevalence is not well known. The institutions does not have bronchoscope equipment, unable to do biopsies, unable to isolate other fungus e.g. Aspergillus from sputum than candida.

Most of the diagnosis of pulmonary tuberculosis is based radiological or clinical diagnosis than sputum. With the advent of HIV most pulmonary tuberculosis is sputum negative. Also from clinical experience majority of the patients suspected PTB (clinical and radiological) but have sputum negative for AFFB do respond very well to ATT.

A review of 221 randomly selected files was done, with interesting results Firstly, the symptom of cough was picked out, and based on it, and categories were made. Up to 41.2 % had a complaint of chronic cough (> than one month), 25.7 % had an acute cough as a complaint and with a previous history of being treated for a respiratory infection. 15.4 % had a cough of less than one month, but the X-ray were very suggestive of tuberculosis (extensive infiltrates and/or a huge unilateral exudative pleural effusion), or clinical picture (chronic weight loss, night sweats, persistent fever etceteras).

This shows that coughs *per se,* though the commonest complaint, is not in all the TB we diagnosis. This could also explain why many are either sputum negative or not diagnosed based on sputum. Up to 17% did not have any respiratory symptomatology, though clinically and /or radiologically suggestive. 6.7% had vague symptomatology and were put on tuberculosis treatment as a 'trial' therapy. This small group includes those who had not response to conventional antibiotics,

wasted, non-specific but abnormal Chest X-ray with infiltrates or shadowing. The mere fact that these patients died, in itself imply either advanced/disseminated disease, missed diagnosis, or another untreated underlying disease process.

Patients had to buy (and still do) their own sputum containers and majority could not afford, thus ATT was started without sputum collection. In some cases where sputum is not done, patients got discharged, on antibiotics, to their local clinic for follow up. If any of these candidates were open cases, then they were infectious and spread the disease in the community.

Only 15 % of our tuberculosis diagnoses are based on sputum positively. This is based on samples taken after request for AAFB. At least an attempt by doctors to ask for sputum for AAFB was in 83% of the reviewed files, though only 53% get to have it done.

Another interesting finding was that 57% of these patients had actually been treated for tuberculosis within the last five years. There are questions raised out of this. Is it a problem with the regime, or compliance, or that the immune system is weak, or the pathogen burden in the environment is too high, or it is the emergence of resistant strains?

There is an increase in cases of extrapulmonary tuberculosis from. Tuberculosis of the abdomen is not an uncommon diagnosis. It is based on chronic Ascites with an exudate and lymphadenopathy on ultrasound abdomen.

Up to 5.7% of all echoes done show pericardial effusion. These individuals are started on TB therapy and do very well, hence should ideally be classified as Tuberculosis, but currently fall under 'Other form of heart disease' (see below).

There are possible explanations to the progressive increase in mortality.
Since tuberculosis is notifiable disease medical staff have become sensitive in detecting .On the other hand the disease might be over diagnosed. Tuberculosis diagnosis largely seems to be syndromic, and also based on radiological findings. There are other diseases that can cause the same features of chronic cough, fever and wasting, just like there are other causes of abnormal X-ray in chronically ill patient, which can be mistaken for tuberculosis, but are not sought.

Till now, treating tuberculosis is free of charge. As expected, this should reduce death rates since TB is treatable, but this seems not to be the case. There is a TB tasks force and the national AIDS STD and Leprosy and TB; The Scandinavian countries have made drugs available. JICA and WHO have not only upgraded but also improved laboratory diagnosis of tuberculosis. In other words the Central Board of Health, with the Ministry of Health. Has put in certain measures to control tuberculosis.

A possible reason for the rise in numbers of tuberculosis in rise, the increase in the poverty levels in the country. Over the period of study, the economy had the worst hardships, partly due to closure of the mines (main source of Zambian foreign exchange). This and also due to the restructuring of the public sector resulted in reduction in job opportunity and increases in levels of unemployment. Consequently, poverty increased, to an estimated 80% living below the poverty datum line. Poverty is well associated with tuberculosis. Firstly most of the unemployed live in unplanned, overcrowded, and temporary, poor sanitation housing structures, and secondly poor nutrition leads to weakening of the defence system, making an individual vulnerable to communicable disease including tuberculosis.

Lusaka population increased by 2 million soon after the closure of mines, and indeed in extension of shanty compounds. In these areas, as mentioned poverty is

high so is crime including sex for money. This in it self directly leads to a rise in STD related diseases in including HIV and AIDS.

Another explanation is the increase in cases of open Tuberculosis. This is partly lowered immune system because of high HIV/AIDS, poverty, malnutrition and other diseases.

Secondly, most periurban clinics and the UTH itself discharge patients before they become sputum negative, partly because of congestion and limited bed capacity. The consequence is that open TB cases go back to the community and may spread the tuberculosis.

The prevalence of HIV/AIDS is very high in Zambia. At least one out of every five has the disease. Patients with AIDS have a lowered cellular immunity and this makes them vulnerable to developing tuberculosis. Patients with a combination of the two diseases tend to have a chronic and debilitating illness. These patients seeking health will have visited most peri-urban clinics and private clinics. Also, majority of health providers does not have admission facilities. Consequently they get referred for 'further evaluation' to the UTH, usually as terminally ill cases. This in itself does raise the death rate independent of any possible intervention the medical staff might put in. Some circles have called the institution a 'dispatch bay'. Thus by the time they are in the institution they re is little intervention to be done to save the situation.

AIDS is thus possible contributions to high TB death rates especially that anti-retroviral therapy is not only very unaffordable but also the institution does not stock them for patients.

PNEUMONIA

Pneumonia is an emerging and increasingly becoming an important cause of both morbidity and mortality. It is the fourth of the top ten causes of admissions to the UTH in adults. It diagnosed when a patient present with respiratory symptomatology like coughing, fever and chest pains, and crepitations are found on examination.

Between 1990 and 1999, pneumonia was responsible for 18,129 admissions due to. There were 3,049 who died and accounted for up to 7% of all admissions. It's the fourth main cause of admissions after Malaria (28%), Tuberculosis (17%) and Gastro-enteritis (9%).

As regards mortality, up to 16.9 % of all admissions due to pneumonia die in hospital. Of the top ten causes of death, it ranks in the 8th, only beating malaria (10%) and hypertension. Diabetes has a higher death rate (19.2) than pneumonia.

Over the last ten years, admissions due to pneumonia have been very high. In 1990, there were 1,693 admissions. The numbers swung up to 2,302 in 1991 only to start dropping over the consequent two years. In 1993, there were the least admissions (1,230). Within one year the numbers started to rise sharply all over again. In 1994 there were 1,466, rising to 2,324 by 1995. This is the year that recorded the highest admission ever. Again, the numbers started coming down, however, not to as low as the initial drop in1993. There were 1,653 in 1997 and started rising all over again in the consequent two years recording 1,792 in 1998 and 1867 in 1999.

The mortality trends for pneumonia over the period of study have shown a progressive rise both in number of deaths and percentage pattern. In 1990, 193 patients died out of 1,693 admissions. The figures have generally remained above 200 deaths per year. Since 1996 however the numbers reached 367 (1997) and

384(1998) and in 1999 were 502. Regardless of the swings in admissions, deaths per admissions still progressed and remained high.

Looking at the numbers who died per admissions, the trends are showing that the death rate has actually gone more than twice the figures. In 1990 11.4 % percent died. From 1991 to 1996 the death rates gradually increased from 12.6 to16 % deaths per admission. In 1997, 22.2% died, and by 1999 up to 26.9 % had died.

The decline in the numbers of admissions in the first three years (1991-3) would be attributed possibly to the introduction of health reforms. The empowerment of periphery clinics resulted in consequent reduction in numbers of admissions and deaths. By 1994-5, health reforms were facing problem in terms of funding and staffing. The clinics were underfunded and shortage of basic surgical medical supplies was common. This resulted in frustration. Over the period of time the economy had declined further, with our local currency doing poorly. The result was hiking of prices of essential goods, but without equal increases in health workers take-home pay. The end result was frustration and consequent leaving of many health staff to seek greener pastures outside the country.

The progressive increase in mortality rates might be attributed to the progressive weakening of the economy and consequently increase in poverty and disease, continued lowering of the immune system (many who were HIV positive becoming AIDS). Besides, most chronically and terminally ill patient's end up in the UTH, and this tends to reflect as high mortality.

Over the entire ten years of study, the insfitution has continued to receive less and less yearly financial allocation from the Ministry of Health, while on the other hand the number of admissions has continued to get higher, economy has continued to tumble. The overall result is recurrent and in some cases persistent absence of essential medical and surgical supplies.

Patients with pneumonia present differently to the Hospital. Some do not have a productive cough as a complaint, thus do not produce sputum. Not all doctors ask for sputum all the time. What this means is that few patients submit sputum for the determination of the aetiological agents. Furthermore, there is little, if any, supervision during submission, to determine whether it is really sputum and not saliva being submitted. What this entails is that very little sputum, are on average collected. It also implies that we do not know the causative organisms of a lot of pneumonia. Worse still, viral pneumonia is rarely diagnosed. Atypical, opportunistic viral and some fungal pneumonias are not confirmed by the laboratory. The danger with this ranges from giving, wrong therapy altogether with wastage on antibiotics and promotion of resistance, to increased morbidity and mortality, and indeed the unjustified use of ATT.

However, over the last ten years of study, there has been an increase in pneumonia cases, requests for sputum examination by doctors and hence increased specimens for sputum Microscopy culture and sensitivity. The numbers have more than tripled. The types of pathogen patterns have significantly changed. There is an emergence of new pathogens.

In the last three years of the study there were an average of 450 specimen of sputum per year. For each of these, microscopy is done looking for pus cells and epithelial cell then bacterial and fungal elements. Culture and sensitivity was also done. 32% of these specimens show no bacterial or fungus on culture. What is reported is either "no pathogen" or "normal flora". Of the remaining 68% where an organism was isolated has the following breakdown. Up to 33.6% of the sputum's showed bacteria as the causative organism. The further breakdown was Gram positive cocci account for 24 % of all specimens. Gram negatives accounts for up to 9.4 % of isolated pathogens.

Up to 17.2% specimen demonstrated fungus as the main isolated pathogen. And up to 9% show both fungus (candida) and Bacterial pathogens.

Both streptococci and Fungi tend to be the normal flora of the respiratory system. However in this case they are pathogens because, a consideration was done to look at the pus cells, which were high in all cases where a conclusion of was made. Furthermore, they were significant and pure growth.

Isolation of gram positive as a pathogen is expected. Streptococcus is the commonest bacterial pathogen to cause pneumonia. This group of patients probably had community-acquired pneumonia. Crystalline penicillin is the most used antibiotic for acute pneumonia's. Only a third of patients of admitted patients who submit sputum have bacterial pneumonia.

Up to 9.4% were gram-negative pathogens *(*mostly *E. Coli).* These organisms Are enteric pathogens and not respiratory tract pathogens. This raises a possibility of either immunosuppression due to AIDS or a nosocomial infection, or aspiration of bowel contents. Whichever the case may be, penicillin's are unlikely to work. This raises a number of issues. We do not know how these patients presented to the hospital, or how whether they had been hospitalised previously or not. It would *be interesting to know whether any of these patients were consequently given* appropriate therapy or whether they actually survived.

The presence of fungus as a pathogen in the respiratory system highly suggests a lowered immune system of the cellular type. Up to 17.2% are fungus pneumonia. The institution has rarely, if ever, stocked IV Ketoconazole as an intravenous to treat these organisms. Thus if medication is not bought by the patients or relatives its possible mortality results. This also raises the issue of getting very good history and paying attention to detail when reviewing these patients.

These findings do suggest that HIV and AIDS are a major underlying problem in some of our pneumonia's. Probably knowing the HIV sero-status of patients, and determining the chronicity of illness in patients presenting with pneumonia could

be some of the clues of the type of pathogen. Secondly, a random check of 200 files of patients who died of 'pneumonia' between 1990 and 1999 revealed that 79% of the deaths due to pneumonia were ages between 15 and 49 for both sexes. Interestingly, this is the same age group most affected by the HIV AIDS pandemic in the country. Clinical observations have shown that a number of these come with recurrent pneumonias, and some are consequently started on ATT treatment. As mentioned under Tuberculosis, a significant number of patients with chronic cough and weight loss or, abnormal radiological findings are started on ATT.

On the other hand, pneumonia as a diagnosis is overused. There are patients who come with constituent's symptoms of tuberculosis, but since sputum has not been done, the doctor's admission diagnosis is pneumonia. In the same like, to justify the use on an antibiotic, while the patients awaits investigation for TB. We are also aware that patients with tuberculosis might not have sputum, later own it being positive. Also tuberculosis does present as a "pneumonia", and in most cases that is what brings patient to hospital. If the patient dies while he is under investigations, the diagnosis recorded will be pneumonia while in actual fact it could have been tuberculosis.

MALARIA

Malaria had the highest numbers of admission in UTH. Between 1990 and 1999 a total of 78,717 were admitted. It accounts for 28% of all admissions to the medical wards. Tuberculosis (17%) and Gastro-enteritis (9%) follow it. The diagnosis of Malaria is in most cases clinical.

As regards mortality, 7,785 died. Thus, up to 10.4%, on average per, admission per year died in hospital. It is the 8th cause of death, only beating hypertension (7.6%). Diabetes has a higher death rate of 19.2%.

Malaria has generally very high numbers of admissions. In 1990 there were 8,569. There was a small drop in 1991 to 6,394. In 1992 the numbers started rising. In 1992 there were 7,874 continued to rise to 8,623 in 1993. There was a small drop in 1994 to 8,003, but immediately in the next year, Malaria recorded the highest number of admission ever of 10,742. Since 1997 there was a progressive decline in admissions. The numbers recorded in the last three years are the smallest ever recorded. In 1997 there were 6,374, in 1998, 6,621 and 1999 there were 5,666 admissions.

The mortality trends for Malaria from 1990 to 1999 had shown a progressive rise in mortality both in number of deaths per year and percentage death per admission that progressively worsened. In 1990, 429 patients died out of 8,569 admissions, making the percentage death per admission of 5%. This is the lowest ever.

The numbers of patients dying continued to rise. In 1995, 739 patients died out of 9,851 admissions, making death rate a death rate of 7.5%. From 1996 the death rate went in to double figures for Malaria. In 1996, 1,813 died out of 10,742, making a death rate of 16.9%. This was the highest since 1990. The rate reduced slightly to 11.4 % in 1997 (728 deaths/ 6,374 admissions). In 1998 there were 867

deaths out of 6,621, while in 1999 there were 991 deaths out of 5,666 admissions, making 13% and 21% death rates respectively. The average death rate was 10.4%.

There are possible explanations for these findings. The total numbers of admissions have declined over the years due to malaria. The initial drop in 1992 could be attributed to the introduction of the health reforms and the good facilities in the periurban clinics then. Patients had developed confidence and were going to their local clinics for treatment.

From there own it is possible that due to progressive deterioration of clinic performance the patients opted on their own of were continuously referred to UTH and hence increasing the numbers of admissions. The rise in 1997 and a sudden drop in 1998 would be attributed to improved feedback to the clinics and improved services hence drop of referrals.

Another possible explanation is that clinics have been referring more other illnesses like Meningitis, encephalitis, diabetes and tuberculosis as compared to simple Malaria. One reason being that even though the surgical and medical facilities had become are erratic, the staff still had the referral criteria. It is thus possible then that only genuine severe malaria cases were referred. This is further supported by the fact that death rates continued to be high regardless of the drop in total admissions, the continued increase in the death rate would mean, either the organism has changed its behaviour against drugs (resistance), or there is an underlying problem which makes the disease complicated, or patients come when it is too late, or the diagnosis is not Malaria.

To try to answer some question on Malaria, 211 files of patients who were said to have died of "Malaria" were looked at. These were randomly selected, form the study period. The gold standard method of Malaria diagnosis is a Malaria parasite slide. This was done in 67% of the patients. Thus in the other 43% the cause of

deaths are not known, but that at least they had a fever and headache and altered sensorium.

From the patients on whom the slides were done, only 45.6% were confirmed malaria slide parasite positive. This might suggest that we over treat patients who come with fever and altered sensorium. Viruses are well known to cause encephalitis that may be self-limiting and thus might be a possible cause.

It is also interesting to note that 57% of the patients who recovered from cerebral malaria with Quinine had MP test negative for Malaria. There are a number of possibilities. It is possible that parasite might not be positive in all cerebral malaria cases, but it is also possible that these patients could have had self-limiting viral encephalopathy. However, a laboratory weakness is also a possibility. If that was the case, then the false negative rate is dangerously high, and need correction.

Looking at these findings and the average mortality of 10.4%, it is thus likely "cerebral malaria" is the most likely cause of the deaths. However, the death due to Cerebral Malaria is most likely less than 10% especially that other conditions which present in the similar manner are not excluded, and the proportion of malaria slide negative is high. Thus Malaria is not an important cause of death compared to the other top ten causes of death.

An argument that the increased death could be HIV AIDS related would be an interesting one, especially that even though the admission rates dropped so much, the death rate had continued to rise.

Since the presumption is that most of the malaria death comes from cerebral malaria, one might argue that maybe there is progressing/worsening resistance antimalarial drugs. However, all our cerebral malaria patients were put on Quinine and not Chloroquine. Are we abusing Quinine, and using it freely inpatient with

altered sensorium? Up to 66% was not malaria confirmed. It would thus be difficult to attribute the deaths to Quinine resistance.

GASTROENTERITIS

Gastro-enteritis accounts for 9 % of all admissions in the UTH. It is the third highest cause of admission beaten by malaria (28%) and tuberculosis (19%) only. Gastro-enteritis is a clinical diagnosis made when a patient presents with both diarrhoea and vomiting .It is increasingly becoming an important illness. Before 1990, it was a disease largely for children under the age of 5, and was not on top 5 reasons for admission in adults.

From 1990 to 1999 there were 24,854 admissions and 4, 223 deaths. On average, 422 patients died per year. Of the top ten causes of death, it ranks in the 9th. The mortality rate is 16.34 % death per admission per year, on average. The other diseases with lower mortality than Gastro-enteritis are malaria (10.4%) and Hypertension (7%). Diabetes has a higher death rate (19.2) than gastro-enteritis.

The mortality trends for Gastro-enteritis from 1990 to 1999 had shown a sharp rise from 1990 to 1996, then an immediate sharp drop in 1997 and 1998. In 1990 only 743 were admitted. This numbers progressively rose to double and the tripled by 1993 (2281). In 1994 the number had risen fourfold. The highest admission recorded ever in this period of time was in 1995 (4451). There was a slight drop in the next year by 83. A big drop in 1997 to 1962 admissions followed this, though this was still higher than 1990 and 1991. Admission started to rise again in 1999(24.62%).

In terms of percentage death per admission, there has been a general increase in the death rate over the period of study. In 1990 12.7 % died and by 1999, 25.5 % had died. The lowest death rate was reported in 1991 with a 4.3% death percent per admission. But just the next year, the rate shot up to 13.4 %, equalising that in 1990. In 1993 it rose to 17.3% and declined slightly to 14.7% in 1994. From 1995

there had been a steady increase in death rate from 16% to 20% in 1997 and 25.5% 1999. The average death rate was 16.34% death per admission per year.

The progressive rise of Gastro-enteritis cases from 1990 to 1996 was most probably HIV/AIDS related. The disease lowers the immune system and opportunistic pathogens infect the compromised individuals. One of the commonest presentations is diarrhoea and vomiting. As AIDS advances the villi become atrophied and this impairs absorption (malarbsorption) and worsening of diarrhoea. Indeed the number of AIDS cases has increased over the years because of n o availability of HIV drug access and also because with associated poverty levels in the country progression from HIV to AIDS is high.

From 1996 the admissions numbers tumbled. The can be attributed to the springing up of home care and hospices in the Lusaka. Another possible reason was there were discussions within the hospital on how to decongest the hospital. Most are sent to hospices before they reach UTH, or after discharge, they are unable to be readmitted since the hospices have taken over. It was noted that conditions like chronic diarrhoea (attributed to AIDS mostly) can be treated in local clinic, and need not be admitted to UTH.

The last two years showed a new rise in numbers of admissions. This is typical in a case where the campaign drive to discharge or let them be treated at clinic has slackened.

Regardless of the high fluctuations in numbers of admissions over the ten years, the death rate has progressively risen year after year. This might suggest that whatever is being done in terms of control of the diarrhoea, the underlying problem is not tackled. The most likely is the HIV infection. An added explanation to support AIDS is the chronicity of the diarrhoea and vomiting. Besides, the mere fact that since it had no cure and that there has been severe general poverty in

the country, patient's progress rapidly from HIV to full blown AIDS. These numbers were increasing year after year.

A review of 177 randomly picked files for patients, who died between 1990 and 1999, revealed that some patients had persistent/recurrent diarrhoea. The patients were wasted and malnourished and dehydrated. The reason for admission was either dehydration or inability to retain food because of vomiting. Most (74%) of their stools were not sent to the laboratory for M/C/S. Thus it was not possible to determine the pathogens in some of theses patients. A study done by Isaac *et al* shows that at least the third of these patients have *Cryptosporidium* and or *Isospora* diarrhoea.

Another possibility is, since the clinics were unable to handle the continued chronic problem, they opted to send to UTH for 'further evaluation'. The lack of HIV drug has made HIV progress to AIDS, and this progression had been worsened by the increasing poverty of the people in the country generally.

DIARRHOEA

Diarrhoea accounts for 2 % of all admissions in the UTH adult medical wards. It has similar numbers of admissions like 'other anaemia's' and beats Diabetes only. This is a group of patients who present with Diarrhoea without vomiting as the main complaint.

. From 1990 to 1999 there were 6,145 admissions, of which 1,321 died. This made an average of 21.5 % deaths per year. Of the top ten causes of death per admission, it ranks in the 5th place. It has a mortality of 22%. It is beaten by Malaria, Tuberculosis, other Aneamia (26.5%) and "Other forms of heart disease" (26.32%). It has, however, a higher mortality than non-infectious diseases like hypertension and diabetes. It is interesting that it actually has a higher mortality rate than gastro-enteritis (16.3%) by far.

There were 551 admissions in 1990 and the numbers doubled in 1991. However, it came down again to 491 in 1992. In 1993 it reached the highest ever (1,286). From there on the admissions started to decline rapidly. In 1994 there were 888 admissions, and then the consequent years dropped to 491 in 1996 and 226 in 1998. By 1999 there were only 235 admitted.

In terms of trends, the mortality trends for diarrhoea have been generally high between 15 and 24 .3 % (average 22%). In 1990 the percentage death per admission was 18.5 %. In 1991 though the number of admission doubled, mortality dropped to 13.8 percent. In 1992, however, while admission had come down to 491, the death rate had actually tripled to 39.1%. In 1993 when the number of admission was the highest recorded ever, there was 24.8 % mortality. While the total admissions over a period of seven years rapidly declined (1,286 to 235), the mortality remained high and sustained at an average of 21.5 %. The highest were recorded in 1994 (24.8%) and 1999 (24.3%).

The percentage death has remained high, which might essentially means that over the years, there has been no change in policy on management of diarrhoea or that the underlying cause or causes are is not found yet or untreatable. Since 1993 there had been progressive decline in number of admissions from more than 1200 per year to less than 220. The explanations are reduced referral. Either the patients died or the clinics are successfully handed the patients with diarrhoea. As mentioned for gastro-enteritis, it is possible that a number of them went to hospices. For those who had diarrhoea due to undetermined or untreatable (e.g. HIV) died year after year.

It is interesting to see that there has been a progressive decline in admissions of-9 presenting with diarrhoea as compared to those presenting with diarrhoea and vomiting (gastro-enteritis). Where as the admissions started dwindling in 1993, and continued thereafter, after introduction of the health reforms, the gastro-enteritis cases continued to rise till 2 years later in 1995.

One possible reason would be because of the higher likelihood of dehydration in gastro-enteritis, the condition is more serious than Diarrhoea alone. Thus they get admitted and /or referred to UTH It is also possible that those with diarrhoea alone are considered not 'so serious' and are not admitted, or until they have gastro-enteritis.

The higher death rates for diarrhoeas compared to gastro-enteritis might suggest that people with diarrhoea alone have more lethal aetiological agents or that an underlying problem is unnoticed, untreatable or a combination of both e.g AIDS, while those who come with GE have other many causes of the problem among which are correctable or self limiting e.g. acute food poisoning and viral diseases.

OTHER ANAEMIAS

This category of "other Anaemia's" classifies all other anaemia's together but Sickle Cell Anaemia's. It is a huge group, which looks at anaemia as the main feature, and likely cause of death. Thus this is the category includes nutritional anaemia's, aplastic, helminthic, those due to infection, hypersplenism, malignancies etc.

'Other Anaemia' ranks as the 10th cause of admissions accounting for 2 % of all admissions in the UTH. It beats diabetes only. However it has the third highest death rate of 26.5%.

From 1990 to 1999 there were a total of 5,449 admissions. Of these, 1,483 died, making a mortality of 26.5 % deaths per admission. It is the third most important cause of death in the UTHS' adult medical wards, after meningitis and Tuberculosis.

Admissions have more than doubled over ten years. In 1990, 388 were admitted. The numbers increased rapidly year after year reaching 701 in 1995. There was a slight drop in 1996 to 556 but the numbers to rise again year after year reaching the highest numbers ever of 826 in 1999.

Mortality trends for 'Other anaemia's' have not only remained high but have progressively become worse. In 1990, 106 patients died out of 388 admissions, making death rate of 27.3 %. There was a small decline both in admission and death rates up to 1995 to 167 deaths making a death percentage of 23.8 %. The death rate has progressively risen year after year from 1993 (22.5%) rising to 23.8% in 1995 and 26.8% in 1997. By there 1999 were and 34.6% deaths per admission.

A review of 177 files of patients who died of 'other Anaemia" were reviewed. Up to 61% of patients were a full blood count done and none had a bone marrow done.

Looking at the symptomatology, 66% of these patients had fever and were chronically ill patients. Up to 30% had complained of some form of cough, and at least 17 % had a previous history of persistent diarrhoea in the past, except that it was not a present reason for admission. In terms of sex distribution 64% were females. Of these 61 % was less than the age of 30. Most were a mixture of normocytic normochromic and microcytic anaemia's. The reason of death was not clearly known but at least up to 7% died of heart failure secondary to severe Anaemia.

One reason why the death rate has remained very high is inadequate investigation of the underlying cause of the Anaemia, and, which is the probable cause of death. Secondly, those who die of heart failure due to Anaemia is not only due to the scarcity of blood in the blood bank, but also preferences of the blood bank to save blood for obstetrics and gynaecology and the surgical departments.

The worsening of the mortality rates would be attributed to an increase in numbers in the disease conditions, which cause Anaemia (above discussion). For sure number of admissions due infections have over the ten years. Infections are well known of Anaemia. For example, the numbers of cases of malaria, a well-known cause of Anaemia, kept rising.

And indeed HIV continues to remain untreated in majority of Zambians. It progresses into AIDS. Anaemia is a common presentation. The infection also contributes indirectly to mortality in Anaemia. It predisposes to other infections. Besides since up to every 5^{th} of the population is infected, safe blood is becoming difficult to come by, thus some Anaemia patients due to congestive heart failure.

The economic hardship would contribute directly or indirectly to development of Anaemia. For instance malnutrition will lead to increased susceptibility to infection.

Other attributable reasons in line with poverty would be logistics e.g. No transport to bring patient to hospital.

UPPER RESPIRATORY TRACT INFECTION

'Upper Respiratory Tract Infections' is a group of disorders in which a patient has features of upper airway infections e.g. sneezing, throat sore and dry cough. In the UTH, it accounts for up to 6% of all admissions. It is the 5th most important cause of admissions. From 1990 to 1999 there were 16,894 and 3,443 deaths. On average up to 19.7 % patient's die due to URTI and the death rate is getting worse year after year.

There were 295 admissions in 1990 and have increased continuously from year to year, until by 1996, it had increased nine fold (2,736). This was also the year of the highest number of admissions. In the next year the admissions started to decline again. In 1997 there were 1, 876 deaths, and 1,782 in 1998. There was a further decline in 1999 to 1,543.

In terms of death, Upper Respiratory Tract Infections are an important cause of mortality and as mentioned is getting worse. The percentage of Death/ admission had almost doubled (13.2 to 25%). The average death rate was 19.7%. It ranked as the sixth cause of a high death rate. Thus essentially one in every five would die of Upper respiratory tract infection. This is rather unusual and somehow ridiculous.

In 1990 13.2 % of admissions died due to URTI. The rate increased continuously till 1993 to 20.6. There was a drop in the consequent year to 17.7% but then rose again (20.1) in the consequent year (1996). In 1997, the highest death rate ever for URTI was recorded (29.5%). There was yet another declined but just slight to 21.4 %. By the 1999 the rare had increased to 24.8%.

It is very unlikely that URTI per se can result in such a huge number of deaths, unless there is a complication like septicaemia, pneumonia or upper airway obstruction or a silent disease.

All our records are a compilation done by clerks who are non-medical. Though they tend to rely on the doctor's impression, the latter do not always write down the diagnosis in the files of the patients. Also the doctors will neither summarise the files nor write the possible cause of deaths. This leaves the clerks to gamble or guess the diagnosis. It is interesting however to note that whereas the number of admissions due to lower respiratory tract infection (pneumonia and Tuberculosis) is rising, that of URTI has been in the decline since 1996. This does leave a big possibility that most of the diagnoses are actually correct and not missed. That being the case there is needed to find out the possible aetiological agent or an accompanying co-morbid factor. so that the mortality can be reduced.

The continued decline in total admission per year, would suggest that only serious cases are being admitted to the UTH, or that patients will only come when the URTI is complicates with another condition e.g. pneumonia.

The decrease progressively of admissions after a progressive rise in the first half of the study might mean patients with URTI maybe consequently have been susceptible to other pathogens due to lowered immunity, and have progressed to develop lower respiratory tract infection. It could also be possible that, they are not so ill and get discharged soon after overnight observation. Logically we expected the pattern to be similar to the other respiratory pathologies like pneumonia.

The study has shown that the commonest pathogen is pneumococcus. With this pattern, it probably might mean that there is yet another pathogen causing such a picture e.g. viruses or the same pathogen behaving differently in different sites of the respiratory system. One pointer against that is maybe they seem to be self-limiting diseases, unless there are underlying other factors.

Diagnostic facilities are irregular. It is possible, therefore, the diagnosis is being missed. The attending doctor may be was ignoring important features like

crepitations in the lungs just because the dominant symptomatologies were those of upper respiratory tract infection. The duration of the URTI is not known; maybe this could have given a clue to possible chronic illnesses. The progressive rise year after year of death rates regardless of the decrease in total admissions would suggest that there is an aetiology to be sought, which is getting worse year after year

NON COMMUNICABLE DISEASES

INTRODUCTION

There is still a wide-spread misconception that Hypertension and Diabetes are diseases for the developing world that it is a burden of affluent societies only. WHO experts say that scientific evidence testifies to the contrary: In developing countries, out of a little more than 39 million deaths, which occurred in 1993, more than 10 million were caused by the major NCDs (11).

Surveys of indigenous populations in a number of African countries indicated that hypertension rates are on the rise, as is the prevalence of diabetes. In a large percentage of affected individuals both conditions are being left untreated. In Seychelles, hypertension affects 22 % of the population; in South Africa - 16 % ; in Mauritius - 14 %. Diabetes affects from 4 to 15 % of the population of the three countries. In Tanzania, the prevalence of major NCDs in the urban population is four times higher than in the rural (12(,(11).

In Cuba, hypertension prevalence in men and women has reached 34.5 % and 27.1 %, while diabetes affects 5.7 % of women and 2.9 % of men. Hypertension has been found in India, Indonesia and Thailand to affect up to 15 % of the population. Diabetes, while low in rural areas, reaches industrialized-country proportions in urban populations (10) (11).

HYPERTENSION

Hypertension is increasing becoming an important cause of admission and death. It is the sixth cause of admissions to the medical wards, and accounts for 5% of all admission. The death rate is 7.6 %.

Over the period of study 14, 581 patients were admitted. Each year, an average of 1,458 patients was seen. In 1990, 1, 576 were admitted. There was an increase in admissions to 1,662 in 1991. The trend then started to decline. In 1992 there were 1,390 admission and by 1993 1,066. This was the lowest number ever recorded. From there on from 1994 to 1997 the trends showed a progressive rise in admission from 1, 222(1994) to 1, 600 in 1997. The trends started to show a drop in the 1998 and 1999. There were 1,501 in 1998 and 1,436 in 1999.

Hypertension has progressively become an important cause of mortality. Since 1990 the death rates has tripled. In 1990 3.8 % died per admission. By 1999 the death rate was as high as 12.5 %.

The increase in death was gradual and rising steadily. From 1990 there was a gradual rise till 1994(8.9%). There was a slight decline in 1995 to 6.9 %. This was followed by a small increase to 7.6 and 7.5 in the two consequent years. The trend then rose to higher numbers for the first time. 1998 recorded a death rate of 9.1 % and 1999 recorded the highest rate ever of 12.5%. The average death rate per year is 7.4 %. It has the least death rate of the top ten causes of admission in the hospital, but still very high by international standards.

There was a decrease in the numbers of admission in 1991 to 1993 with the biggest drop in 1993. This is the period of health reforms. Clinics were well stocked with different medications including anti-Hypertensive. After that, the numbers started to rise. In the last couple of years the admissions were declining

again. This essentially means some referrals were partly because of lack of facilities and not really justified.

Hypertension can easily be controlled at the clinic. Also it would mean most may not be complicated cases but come to the institution to seek drugs and other services and do not necessarily die due to emergencies. Economic hardship makes making it expensive to buy and drug are unaffordable for most, so since UTH provides free medication, people opt to come.

The death rate shows a progressive increase of death. This is not influenced very much by the variation in admission year after year. The rate though the last o the top ten is stills high. The main causes of deaths were stroke and heart failure. Up to 25.6 % (highest reason for referral for echo) of echoes done demonstrate evidence of myocardial damage due to hypertension. This suggests poor control of hypertension.

It is possible then that persistent death rate is due to irreversible damage to heart, kidneys and the brain. Over the period of study the institution had been unable to reduce death rate. In fact it is getting higher. The increase might be contributed to westernisation of diet, lifestyle and maybe increased stress and environmental factors. Westernised diet alone is unlikely to explain increased numbers because in this period of time poverty levels were as high as 80%. Also, Diabetes, which is yet another disease of lifestyle, is now a very common and important cause of morbidity and mortality.

. Progressive and chronic shortage of medical staff and increased admissions and overcrowding in medical wards may divert attention from hypertension and diabetes to other illnesses. Firstly patients with hypertension may have a dangerously high blood pressure but are otherwise asymptomatic or sign-free. This might deceive an attending health worker to opt to attend to other 'critically ill' looking patients.

Purchase of medication was erratic and had a very limited variety of anti-Hypertensive drugs to select from. And even, then there were very few parenteral medications to control severe hypertension. The commonest available was Hydrallazine, which is also erratic and not the always the best.

With the overall shortage of doctors, increased levels of poverty disease and ignorance, little time is spared to sit down with patients and explain the whole disease process and its complications, the importance of continued taking of medication. This consequently results in poor compliance, and frustration in many patients especially with the fact that regardless of their continued medication the condition is not being 'cured'. These patients, like all other patients with chronic illnesses' need frequent assessment and assurance

DIABETES

Diabetes Mellitus is the most important metabolic disease in the UTH, if not countrywide. The numbers so f newly diagnosed diabetics is ever increasing year after year increasing becoming an important disease. In the University teaching Hospital, of the top ten causes of admission diabetes is the tenth. A total of 2,291 patients have been admitted between 1990 and 1999,as new cases.

. Over the ten years the number of admissions due to diabetes has increased three-fold. In 1990, 171 were admitted. Over three years from 1991 and 1993 there was a decline in admissions from 158 (1991) to 95 (1993). In 1994 the number suddenly rose to 247. From that time the numbers continued to rise. In 1997 there were 340 admissions and in 1999, 343. The average number of admissions per year was 229.

Though Diabetes ranks lowest on the top ten causes of admission, it has an unacceptably high mortality rate i.e. deaths per admission per year. It has a average death rate of 19.2%. This means that every 5th admitted patient dies. With an average of 229 new admissions per year, up to 46 die per year (4 per month) this is a very unacceptable death rate.

Diabetes is the 7th highest cause of deaths in the UTH medical wards. It has a higher death rate than Pneumonia (16.9%), Gastro-enteritis (16.3%), Malaria 10.40% and Hypertension (7.6%).

Over the years, (1990-1999) mortality has not only remained high, but also has continued to rise. In 1990 the death rate was 15.8 %, and this doubled to 32.3 % in the next year. Then for five years, there was a progressive small improvement/ decline in mortality rate. In 1992 the rate was 27.6% continued to decline to 13.9 in 1995. In 1996 the rate started rising again from 16.8 to 18.4 in 1999.

A number of factors may be attributable to rise in cases of diabetes over the decade. These include dietary habits and life style towards westernised, environmental factors, high levels of malnutrition, and infection chronic pancreatitis. There tends to be a strong family history of diabetes in most of these diabetics.

The increase in total cases over the years could be attributable to the above factors in one way or the other. Firstly, there was a decline in number of admission in the first three years. The possible explanation is then that the peripheral clinics had started to stock Insulin. At that time the UTH had very erratic supply and deliberately (policy related) limited stock of Insulin and oral hypoglycaemic. The peak decline is seen in 1993, when the health reforms were just introduced.

However the consequent years, the numbers of admissions rose rapidly. This could be attributed to unavailability or erratic medication in clinics. Also since in that period of time the country had the worst economic performance, many people were retired or retrenched. The poverty datum line rose to 80%. Majority of patients are not able to afford Insulin and/ or oral hypoglycaemic. For a civil servant for instance, one bottle of insulin will cost 25% of his monthly salary, and this is also the cost of one bag of Millie meal (the staple food).

The persistent high numbers of death are worrying and may be attributed to the general poor control of sugars in these patients. Almost all diabetics who die in hospital die because of complication of diabetes. The precipitating factors tend to be an infections especially respiratory or malaria and mere lack of drugs.

A review of 107 files showed that most patients came into UTH with diabetic emergencies mostly hyperglycaemic comas. 47 % of these files did not state whether patient ran out of insulin or not while at home. At least 71% were treated

as though they had an infection (with antibiotics). However the patient's notes were not clear exactly what caused death.

However there seemed to be a combination of erratic insulin administration and dehydration. Septicaemia as an underlying problem cannot be excluded.
HIV/AIDS is difficult to exclude as a contributing factor, but for sure it might be. It is a known cause of chronic pancreatitis, septicaemia both of that can cause mortality and morbidity in diabetics. Firstly, the virus itself, secondly it predisposes to other infections. Apart from that a number of anti-retrovirals cause pancreatitis.

These diabetics live in the most urbanised part of the country. Westernised diets might have contributed to increased cases of diabetics. It is possible the prevalence of diabetes has increased. A study done on the copperbelt, community based, showed a prevalence of 1.1 % diabetics in 1969 (Rolfe M) when Zambian population was 5.5million .The incidence has definitely gone up, but there is no research currently looking into that.

The institution has at least 460 diabetics that are being followed up. Because of overcrowding, few staff and lack of diabetic experts, little time is spent on education. Thus some patients consequently develop complications and die.

There is also possibility of underreporting deaths due to diabetes by the clerks. Diabetics might die of a pneumonia, or Malaria, or Tuberculosis, but this might be recorded as pneumonia and not a diabetic mortality. This is even more likely especially that most of the time a 'single' or 'main' condition has to be entered.

OTHER FORMS OF HEART DISEASE

'Other Forms of Heart Disease' is a group of cardiac conditions other than Rheumatic Heart Disease related. This group includes, Hypertensive Heart Disease, Cardiomyopathies, pericardial diseases (constrictive pericarditis, pericardial effusion), Congenital heart diseases, *Cor pulmonale*, Mitral valve prolapse, Aortic aneurysm. This group of diseases accounts for 3 % of all admissions to the UTH, ranking as the eighths highest cause of admissions .It has more admissions than conditions like "Other Anaemia's"(2%), Diarrhoea (2%), and Diabetes (1%).

From 1990 to 1999, there were 7,624 admissions. Out of these, 2,016 died. This makes the mortality at 26%. This group of heart diseases is the fourth most important cause of death in University Teaching Hospital after Meningitis (46.9%), Tuberculosis (27.6%) Other Anaemia's (26.53%).

In 1990 there were 765 admissions. There was a small reduction in admissions over the consequent three years to 611 (the lowest record). In 1994, admissions started to rise again with 770 that year till 1995 recording 891. In 1996 there was a drop to 556 but rose again in 1997 to 899. There was a slight drop in 1998 and the highest number of admission was recorded in 1999 of 945.This showed a progressive but gentle rise in admission over the ten years

The mortality trends for 'OFHD' a gentle rise from 25.6% in 1990 to 29.3% 1999. The lowest mortality was recorded in 1992 of 21.1 %, then rose to 26.2 %. It has remained high above 24 %.

Echocardiographs are done on almost all suspected cardiac diseases. Thus, most of the diagnoses are confirmed. Over the period of study there was a progressive rise not only in total echo's done per year but also certain forms of heart disease like pericardial effusion's and cardiomyopathy. In the early 90's an average of 200

echoes was done. Most records were neither well kept nor documented, partly because of lack of organisation in that area on the institution.

However, an interesting finding was that pericardial effusion and cardiomyopathy were not as common as they became during the last few years of the study. From 273 echo's done between 1991 and 1993, 41.1 were normal 29.9% were Hypertensive, vulvular diseases were 7.3%, pericardial effusion 5.7%, and dilated cardiomyopathy 3 %. The remainder was a mixture of many other heart conditions including congenital ones.

More than 500 echo's were done each year on average since 1997 The condition confirmed were Hypertensive heart diseases 25.6%, Pericardial effusions (16.6%), Dilated Cardiomyopathy (11.9%), Rheumatic Heart Disease (10.1%), *Cor pulmonale* 2.93%, Mitral Valve prolapse 1.28%. The combined mortality of theses disease conditions has indeed remained very high between 25 and 29%. One possible reason for this is because there was and still is no definitive treatment in Zambia for the heart failure that ensues. All the therapeutic options are supportive.

Almost all moderate to huge effusions have exudates and are treated as tuberculosis (with good response!). More than 65% of tuberculosis is HIV related. This also emphasises the increased importance of tuberculosis). It also emphasises the importance of HIV

Up to 11.9 % of echoes are Cardiomyopathies. This affects mostly middle-aged groups, though all adult ages are affected. The notable increase in the cases might be multi-factorial including heightened poverty levels, and also recent studies which have associated the condition to HIV. On the other hand the increased cases due to hypertension may be stress related. Mortality due to hypertension may directly or indirectly be related to poverty in the sense that most patients may be unable to purchase the Hypertensive medication. The institution has erratic supply of anti-Hypertensive medication.

Besides, the study has also found an increase in number of diabetics, which is well associated with hypertension.

Other reason for increased mortality might include the continued leaving of critical staff from the institution year after year for greener pastures with a very poor patient /nurse, and patient doctor ratio. It is not surprising to see one nurse manning a ward of more than 50 patients.

CHAPTER 7

CONCLUSION

The most important causes of morbidity and mortality account for 80 % of all admissions to the University Teaching Hospital. Fatality rates vary considerably. Meningitis (49.6%) has the highest, followed by Tuberculosis (27.6%), Anaemia's {other than sickle cell} (26.5%), Other forms of Heart Disease {other than rheumatic) (26.3%).

Diarrhoea has a death rate of 22.1% followed by Upper Respiratory Tract infection (19.7%), Diabetes (19.2 %). Pneumonia (16.9%) has a higher death rate than Gastroenteritis (16.3%). Malaria, which was once the main killer, has a death rate of 10.4%, and lastly hypertension (7.6%).

Infections are attributable to most of the mortality; virtually all diseases are either directly or indirectly due to an infectious cause, including diabetes.

The mortality of all top ten diseases is unacceptably high in all the diseases, ranges between 50% of admission to 7 %. Morbidity and Mortality rates are getting high year after year of most of the conditions. Immediate causes of death are not yet established.

Diabetes and Hypertension (diseases of life style) though not among the top eight are causing increased death and are being ignored. They are the two most important non-infectious (Non-communicable) causes of death in the UTH.

Majority of patient referred to UTH are either very ill or are terminally ill. They are brought in as the last resort or when disease conditions are too advanced. Some referrals very unnecessary, and can be handled by referring centres.

Frequent shortages also has made patient lose trust in the institution, hence they're using it not for curative purposes but as a death place. There has been

continued diminution of all staff because of departure for greener pastures or as a result of deaths.

The laboratory and also investigation services are also not very reliable because of budget constraints. The end result is prolonged stay in hospital or incomplete diagnoses at the time of death.

The failure, to some extent, of the health reforms not to perform well has resulted is breakdown of the referral system, resulting is overcrowding at the institution, and consequent stretch on the already tight budget.

Human Immunodeficiency Virus; HIV has affected all diseases. It is thus the most likely number one killer. Patients will not complain of HIV or AIDS , neither will the doctors write AIDS as cause of death, thus it require sensitive careful but vigorous approach to diagnosis. Since there are so many admission, some irrelevant referrals, some terminally ill, determining who should be admitted and how long can stay in hospital would help cut down on costs. Relatives should be involved early and informed about the therapeutic option and about home care services. Counselling and HIV testing should be part of management.

Meningitis; Meningitis is the number one killer in UTH with a death rate of 49.9 %. Review of files showed that almost half of patients had encephalitis and not meningitis. More accurate diagnoses needs to be made, and classification of diseases should include encephalitis. The commonest isolated organism is cryptococcus (37%) and most of the remainder of the CSF is sterile. This strongly suggests that most pathogens are either fungal or viral. Secondly it stresses the effect of HIV, and its frequency in patients with CNS infections. There thus need to be objective through careful patient evaluation to avoid routine X-pen and Chloramphenicol on all suspected meningitis cases. Meningitis is one of the conditions which make patients stay more than a week in the wards. The need for