

**TRENDS IN ADULT MEDICAL WARDS ADMISSIONS OF
BOTSHABELO DISTRICT HOSPITAL
BETWEEN 2006-2008**

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FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF
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DECLARATION

I, PULANE ADELINE CHAKA, declare that this research report is my own work. It is being submitted for the degree of Master of Public Health (Hospital Management) at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or for any examination at this or any other university.

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April 2011

DEDICATION

I dedicate this work to:-

My husband and children for the support and understanding shown during my studies. My colleagues in hospital management for encouraging and motivating me to go on. To my lecturers thank you for tolerating and guiding me. Roxy, your encouraging words, assistance and guidance on the progress of my work.

My brothers and relatives in Johannesburg for housing me when I come for classes in Johannesburg, and my late brother who used to be my road-map in Johannesburg.

A big thank you to all those who contributed in anyway to see me through my studies.

ABSTRACT

BACKGROUND: Trends on medical admissions provide important information to health services planners and implementers. Knowledge of the changing patterns of disease profiles and causes of hospitalisation will help to understand the burden of diseases and address emerging disease patterns and health care needs of a given population. The prevalence of HIV/AIDS and changing patterns of diseases like chronic diseases and infections like tuberculosis (TB) as causes of morbidity and mortality need to be researched, in order to bring about changes in their management and the management of health services. Seeing that there is little or no information on causes of admissions in Botshabelo District Hospital, there was an assumption that HIV/AIDS is the leading cause of medical admissions. The study described the demographic profile, disease profile and their outcomes for patients admitted in the medical wards of Botshabelo District Hospital over a three year period. It will also determine the causes of mortality and the average length of stay by disease profile.

AIM: To describe admission trends among adult medical patients in Botshabelo District Hospital.

METHODOLOGY: A descriptive, cross-sectional study design was used for this study. The setting of this study was the Botshabelo District Hospital in the Motheo Health District in the Free State Province, using both the male and female adult wards of the hospital. A retrospective record review of patients admitted during 2006-2008 was done. Information was collected from the Admission and Discharge Registers and patients records, using a datasheet. Data on the following variables was collected: patient profiles, admission rates, mortality profiles, outcomes and average length of stay. The collected, validated data was analysed using the Epi- Info 8 software.

RESULTS: Seven hundred and three patients were sampled over the three year period of 2006-2008 at Botshabelo District Hospital. There was a slight increase in the number of admissions from 2402 in 2006 to 2498 in 2008. The mean age of admissions was 45.3 years. The average length of stay was 5 days, with a range of 1-9 days. Tuberculosis and HIV were the leading diagnoses, while cerebrovascular diseases, congestive cardiac failure (CCF), hypertension and diabetes were in the top ten causes of admissions as well. Deaths significantly increased over the three years from 38.8% of admissions in 2006 to 54.7% of admissions in 2008. It was found that there was a greater odds dying in female patients (OR 1.55) and older patients (18.79 in the oldest age group), patients with HIV (OR 4.93) and blood disorders (OR 5.97) as compared to circulatory disorders but there was a lower odds of 0.36 in patients residing in H-section. This could be due to the fact that the H-section community is mostly a working and younger community whereas the A-section community is comprised of an older and poorer community of people who came from the farms.

CONCLUSION: The research provided reasons for admissions, and mortality in the medical wards. Indeed HIV/AIDS and TB are major public health problems. According to this study mortality caused by HIV/AIDS composed 21.1% and TB 12.6%. In the top ten diseases that caused admissions, HIV in 2006 was 33.6% and was number one cause of admission. In 2007 and 2008 TB was number one at 26% and 23% respectively. There appears to be a serious problem with the increasing mortality in patients admitted in the wards.

The information and the recommendations made from the research will assist the health planners at various levels like the district, provincial and national level, in restructuring or improving health services and redistributing resources. Improvement around HIV/AIDS and tuberculosis management needs to be prioritised.

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GLOSSARY OF TERMS

Admission = A patient being registered to the hospital and utilizing a hospital bed in a ward.

Average length of stay = Average duration of patient stay in health facility (Health Systems Trust, undated)

Complications = untoward outcomes

Diagnosis = the ailment or reason for admission

District hospitals = District hospitals provide first level hospital care. It is a referral facility for clinics and community health centres and is responsible for referring patients to higher levels of care if required. District hospitals also provide support to health workers at lower levels of care, in terms of clinical care and public health expertise.

ICD-10 code = The ICD-10 code stands for International Classification of Diseases and related health problems - 10th revision. It is a coding system developed by the World Health Organization (WHO) that translates the written description of medical and health information into codes in a standardized format, e.g. J03.9 is an ICD-10 code for acute tonsillitis and G41.0 - Epilepsy, unspecified.

Outcome = Refers to the patient's final outcome, i.e. discharged, transferred out or died.

LIST OF ABBREVIATIONS

ALOS	Average length of stay in hospital
ANOVA	Analysis of variance
ART	Antiretroviral treatment
CCF	Congestive Cardiac Failure
CD	Communicable diseases
COPD	Chronic Obstructive Pulmonary Diseases
CVA	Cerebral Vascular Accident
DALY	Disability-adjusted life year
KZN	KwaZulu-Natal
LRTI	Lower respiratory tract infection
NCD	Non- communicable diseases
OPD	Outpatient Department
PHC	Primary health care
TB	Tuberculosis
WHO	World Health Organization

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

1.1 BACKGROUND

The changing patterns in the causes of diseases poses a health problem and a burden to facilities as resources are getting scarcer as needs arise. The increase in medical admissions in public hospitals in South Africa has caused an overload on resources allocated, including human resources. With the HIV/AIDS and tuberculosis (TB) pandemic, the admission of these patients into district hospitals is aggravated.

The influx of patients in district hospitals, with some by-passing primary health care (PHC) clinics, has caused a burden to the facilities. The systems in place, like the referral system, nurse–patient and doctor–patient ratios are weakened. According to current estimates, South Africa is ranked twelfth in the world in terms of deaths per 100 000 population (Central Intelligence Agency, 2009). It is assumed that the high rate is due to HIV/AIDS, respiratory infections and TB; and the low socio-economic circumstances of the communities exacerbate the situation. Bradshaw et al. (2003), in the Initial National Burden of Disease study showed the impact of HIV/AIDS as one of the leading causes of deaths especially where comorbidity is experienced. This was also reported by Conolly, Davies, Wilkinson (1998) and Zwang, Garenne, Kahn, et al. (2007). In 1998, Conolly, Davies, Wilkinson (1998) reported an increase in deaths due to tuberculosis among adults with HIV/AIDS. While more recently a study in rural South Africa showed an increase in mortality in co-infected patients with PTB and HIV/AIDS (Zwang J et al. 2007).

However, with the changing patterns of disease, the non-communicable diseases like the ischaemic heart diseases and the cerebrovascular diseases are becoming more common and admissions of such patients are increasing, and these patients also tend to stay longer in hospital. In South Africa it is estimated that non-communicable diseases account for 28% of the total burden of disease as measured in DALY (disability adjusted life year) by WHO; 12% of this is from cardiovascular diseases, diabetes mellitus, respiratory diseases. Cancers contribute 12% of the total burden of disease and 6% is accounted for by neuro-psychiatric disorders like schizophrenia, bipolar depression, epilepsy and dementia (Mayosi et al. 2009). The burden of non-communicable disease in South Africa is 2-3 times higher than in developed countries (Mayosi et al. 2009), and is a significant problem in rural South Africa and also in poor urban areas (Mayosi et al. 2009).

According to the World Health Organization, the greatest burden of disease is within the adult populations, where 91% of people aged 15 years and older in high income countries and 61% in low and middle income countries are affected (Joint United Nations Programme on HIV/AIDS, 2008).

In Botshabelo District Hospital it was often assumed that the majority of adult medical admissions are HIV/AIDS related. In 2006 the Hospital began providing antiretroviral treatment (ART), however medical admissions seemed not to have changed significantly since this period. In addition, no research has ever been done to actually investigate the medical causes for admissions and the burden of disease in this district hospital. Information on hospitalisation, especially on medical reasons, is an important aspect for health service planners and policy-makers. However the necessary information is often lacking due to the little information that is kept and utilised by hospitals. There is a lack of research especially at district hospitals, and no studies have been conducted in Botshabelo District Hospital or the Free State Province. This study has thus investigated the

trends, admission diagnoses and mortality profile in the adult medical wards in order to advise health services planning and to improve health services provision.

1.2. BOTSHABELO DISTRICT HOSPITAL

Botshabelo District Hospital is situated about 60 kilometres east of Bloemfontein in the Botshabelo sub-district of the Motheo District in the Free State Province (Figure 1). The sub-district is divided into sections named A-section to W-section. Each area is composed of a community of approximately three thousand houses. Each area has a PHC clinic which is within accessible distance to that community, both with walking or using public transport. The hospital is centrally situated at a maximum distance of twenty kilometres from the furthest point. The clinics operate during working hours only, which is from 8am to 4pm. There are also larger referral clinics which operate 24 hours a day and have doctors visiting daily. Botshabelo District Hospital is the only Level 1 referral hospital for all 14 clinics in the area.

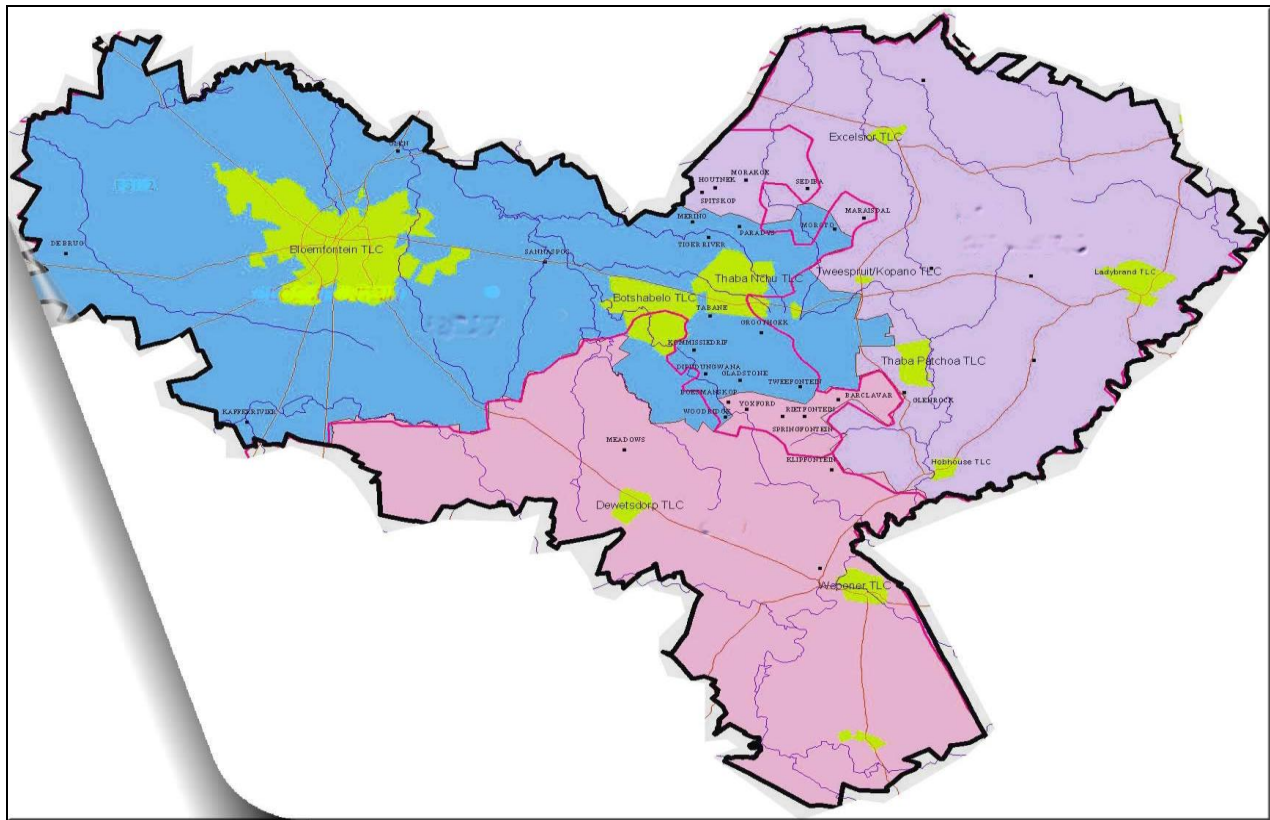


Figure 1: Map of the Motheo District (Botshabelo is the central green area)

The hospital has 135 approved useable beds, of which 68 are allocated to 34 male medical and 34 female medical beds. There are also other wards like Maternity and Labour wards, Paediatric wards and the Postnatal ward, and other sections like the Out Patient Department, Casualty, and Operating Theatre. Botshabelo District Hospital admits about 200 medical patients per month. As mentioned earlier, it is a referral hospital for 14 primary health care (PHC) clinics, serving a population of 500 000. It refers patients for Level 2 services to a regional hospital which is 60km away. There are three ART sites in the sub-district, with one onsite, and the hospital is a treatment and admission site for HIV patients since the introduction of ART programme.

The Outpatient Department (OPD) renders care to patients with chronic diseases, like diabetes mellitus, hypertension and minor ailments. TB patients who need hospitalisation are admitted to the hospital, but there is no special TB ward. The

hospital has nine Medical Officers, who also support the surrounding PHC clinics, 75 nurses of different categories and 125 administrative support staff. The hospital renders generalist level one health services, according to the District Hospital Package.

1.3. LITERATURE REVIEW

1.3.1 BURDEN OF DISEASE

The global burden of disease due to medical disorders is enormous. It has been a changing phenomenon worldwide, with variations from country to country. Global projections for the years 1990-2030 predict that the leading causes of death will be due to infections (communicable diseases), ischaemic heart diseases, cerebrovascular diseases, HIV/AIDS, and chronic obstructive pulmonary disease. (Mathers and Loncar, 2005). In 1990 communicable, maternal, perinatal and nutritional disorders accounted for 17.2 million deaths, where non-communicable diseases accounted for 28.1million deaths (Murray and Lopez, 1997). Murray and Lopez (1997) also found that in 1990 the leading causes of deaths were ischaemic heart disease, cerebrovascular disease, lower respiratory infections, diarrhoeal disease perinatal disorders, chronic obstructive diseases and tuberculosis. it is projected that deaths due to non-communicable diseases will rise from 57 million in 2002 to 74.3 million in 2030. There will however, be a greater shift from communicable diseases to non-communicable diseases (Mathers and Loncar, 2005).

Sub-Saharan Africa is also undergoing an epidemiological transition. Vascular diseases like stroke are increasingly been found to be contributing to the burden of disease. In Sub Saharan Africa mortality due to stroke is higher than in some high income countries (Connor et al. 2007). In South Africa the risk of stroke is increasing, and vascular diseases is estimated to escalate to 5 million by 2020 (Connor et al. 2007). South Africa is thus faced with escalating non-

communicable diseases, which are forming a greater portion of medical admissions and are even ranking within the top ten diseases. In a study conducted in CapeTown, at GF Jooste Hospital, which is a district hospital, results indicated that circulatory disorders, composed of hypertension, stroke and heart failure, dominated admissions and were amongst the five most common reasons for admissions in the medical wards (Marszalek and De Villiers, 2006).

However, HIV/AIDS and tuberculosis continues to ravage the region and South Africa is greatly affected. One study conducted in King Edward VIII Hospital, a tertiary hospital in Durban, South Africa, estimated that 40-50% of the South African workforce could die of AIDS by 2014, however this was before the introduction of the ART programme. It was also eluded that patients with diseases like tuberculosis, and meningitis were likely to be infected with HIV. This study showed the massive impact of the HIV/AIDS epidemic and associated diseases on health care delivery (Colvin et al. 2001).

1.3.2. ADMISSION TRENDS

Admission trends are influenced by many factors from country to country. This depends on factors within the health system, and population factors such as utilisation rates. However, admission rates can also be used as an indicator of disease patterns like pandemics of HIV/AIDS, and the underlying burden of disease. Internationally, the Soviet Union and some other countries that have changed their health systems have focussed on prevention by strengthening their Primary Health Care System (PHC), with subsequent reduction in admission rates (Hensher, Edwards and Stokes, 1999). Health care in developing countries is still very curative. Their focus is more on hospitalisation hence they have increases in admissions and related challenges of resources.

1.3.2.1. The impact of HIV/AIDS and TB

HIV/AIDS has had a huge impact on health service delivery, and it has most affected the admission load and patterns in medical wards. This has differed somewhat between countries with high prevalence of HIV/AIDS compared to low prevalence. The impact of having a well functioning ART programme on medical admissions, however, is not very clear. In studies conducted in the United Kingdom, the changing patterns of admissions showed an increase in hospital admissions during 1989, but declined with the introduction of ART (Mocroft et al.1999; Paul et al. 1999). The effect thereof brought changes in the future allocation of resources and the management of patients. In contrast, another study using data from a community hospital in Israel, where HIV/AIDS prevalence rates are low, reported an increase in admissions related to pneumonia over a five-year period from 1999 to 2004, but found that the three most common discharge diagnoses were coronary artery disease, heart failure and pneumonia (Stein and Zeidman, 2006).

Developing countries, however, struggle with the burden of HIV/AIDS. A study conducted in the Kenyatta National Hospital in Nairobi (Arthur et al. 2000) reported an inexorable increase in admissions due to HIV/AIDS and a doubling in bed occupancy rates to 190%. The number of admissions rose to 39% with 35 patients admitted per day leading to a decrease in admission of non-infected patients. In other African countries like Malawi over 70% of admitted patients were HIV positive (Lewis et al. 2003).

HIV/AIDS and TB has also affected hospitals in South Africa with an escalating trend in admissions. A study conducted in a rural district hospital of Hlabisa in KZN reported a rise in total admissions from 228 to 626 between 1991 and 2002. General hospital admissions rose by 81%. After 1991, TB became the most frequent diagnosis to the extent that, in 2002, it was the leading cause of death (Reid, 2005). Whereas, in a large tertiary hospital in Durban, 54% of medical

inpatients were infected with HIV of whom 56% were infected with tuberculosis (Colvin. 2001).

At the GF Jooste Hospital in Cape Town, hospital admissions increased by 44 % over a period of 11 years. Medical admissions consisted mostly of the infectious diseases of HIV/AIDS and pulmonary tuberculosis at 57%, circulatory disorders at 39% and gastro-enteritis at 13% (Marszalek and De Villiers, 2006). Finally, a study done in Leratong Hospital between 2001 and 2004 reported an increase in patients admitted due to HIV/AIDS related conditions; whose stay in hospital also showed a significant increase (Chukwuemeka, 2007).

1.3.2.2. The impact of non-communicable diseases

With changes in life patterns, like adopting Western life styles, non-communicable diseases are increasing, and so too are their admissions in the medical wards (Joubert et al. 2000). A huge number of hospital admissions are now as a result of strokes and uncontrolled diabetes mellitus and its consequences. This has some influence on disease mortality patterns and non-communicable diseases now account for 37% of deaths (Bradshaw et al. 2003).

The World Health Organization predicts that ischaemic heart disease may be a leading cause of death by 2030 if drastic steps are not taken to curb this disease (Mensah, 2008). In addition, diabetes mellitus has become one of the major health problems. WHO estimates that the number of diabetics will grow from 135 million to 300 million by the year 2025 (Mathers and Loncar, 2005). In Pakistan it was found that there is an increase in the number of admissions due to diabetes and also longer hospitalisation of these patients due to complications (Tarin and Khan, 2004). The study found that the major reasons for admissions were due to infections like TB, pneumonia, hepatitis, and also neurological, cardiac and renal complications (Tarin and Khan, 2004).

1.3.2.3. Age and sex distribution of patients admitted in medical wards

From records studied in a rural hospital in KZN, there has been an increase in admissions for males; although admissions for females seemed to be decreasing (Reid et al. 2005). In various studies the mean age of admissions ranged between the ages of 30 to 40 years. At GJ Jooste Hospital in Cape Town the mean age was 40 years (Marszalek and De Villiers, 2006), while at Hlabisa Hospital the mean age was between 34-39 yrs (Reid et al. 2005). In Blantyre, in Malawi, the mean age was 31 – 40 years (Lewis et al. 2003). This is a crucial age for people who should be economically active and whose health is of utmost importance.

1.3.3. AVERAGE LENGTH OF STAY

The Average length of stay of patients admitted to hospitals depends on the type of disease and its course of treatment. In the study conducted in Hlabisa, although there was an increase in admissions, and a rise in HIV/AIDS and TB admissions, the length of stay in hospital significantly dropped from 10.9 days in 1991 to 7.9 days for the rest of the study period up to 2002 (Reid et al. 2005). With the HIV/AIDS and TB epidemics where bed capacity was not increased to accommodate the volumes of non infected and infected patients, volumes of discharges had to be increased.

1.3.4. MORTALITY

There are a number of factors that affect mortality during hospitalisation. The cause of hospitalisation, the complications experienced and other variables, like gender, age and diagnosis impact on mortality (Reid et al. 2005). In some hospitals most of the mortality was associated with the impact of HIV/AIDS and TB. Of the medical admissions in Blantyre hospital in Malawi, 57% of the medical deaths occurred in patients aged 21 – 40 years and were mostly associated with HIV and TB infections (Lewis et al. 2003). The mortality rates increased at the

time of the Hlabisa Hospital study and 30% were due to TB (Reid et al. 2005). TB was also found to be the leading cause of mortality, followed by HIV/AIDS, in KZN during 1998-2002 (KwaZulu-Natal Department of Health, undated). This might not be the case now, as the WHO in 2004 reported that HIV/AIDS was the leading cause of death in African countries (World Health Organization, 2004). This may have also taken a different turn due to the implementation of the ART after 2004 (Boulle et al. 2008).

Non-communicable diseases can also cause a huge burden in terms of mortality. In a hospital in the United States, mortality was noted to have increased due to diabetes mellitus, congestive cardiac failure (CCF) and stroke. However, chronic obstructive pulmonary diseases (COPD), one of the major causes of hospitalisation, was projected to become the third most common cause of mortality in United States by the year 2020 (Holguin et al. 2005). In Spain the mortality of diabetics increased due to coronary heart disease, which was the main reason for needing to admit diabetic patients.

Similarly, a study conducted in a teaching hospital in Nigeria between 1996 and 2005 revealed that infections accounted for 35.6% of mortality, mostly being HIV and tuberculosis or both. Next to infections were the chronic diseases such as stroke, chronic liver diseases, heart failure, and diabetes mellitus. This resulted in the need for health services to ensure an interruption in the transmission of infections and to develop massive screening programmes to manage chronic diseases (Chijioke and Kolo, 2009).

1.4. PROBLEM STATEMENT

There is a great need for admissions of medical patients, leading to an increase in hospital admissions. The HIV/AIDS pandemic, TB co-infection and the rise in non communicable diseases requires that the health system change, most of all

hospitals, as they will not cope with the increasing number of patients who require hospitalisation unless the number of beds are increased.

It is estimated that more than 6 million people are living with HIV in South Africa and may need future hospitalisation in these times of scarce resources. However, chronic diseases are increasing as well and also contributing to morbidity and mortality. Overall, there is a decrease in life expectancy and premature mortality (Bradshaw et al. 2003). Knowledge on reasons for hospitalisation and the burden of disease faced by district hospitals will assist health planners and hospital managers to better manage hospitals and utilise resources to provide optimal care.

1.5. JUSTIFICATION OF THE STUDY

Seeing that there is little or no information on causes of admissions in Botshabelo District Hospital, there was an assumption that HIV/AIDS is the leading cause of medical admissions. This study reviewed the causes of admissions in the medical wards, including HIV/AIDS, other infections, TB and non-communicable diseases like diabetes mellitus and cardiac disease.

1.6. AIMS AND OBJECTIVES OF THE STUDY

1.6.1. AIM

The aim of the study was to assess the burden of diseases and trends in patients admitted in Botshabelo District Hospital's adult medical wards during 2006-2008.

1.6.2. SPECIFIC OBJECTIVES

- 1.6.2.1 To describe the demographic profile of patients admitted to Botshabelo District Hospital medical wards during 2006-2008.

- 1.6.2.2 To determine the disease trends in the number of patients admitted in the medical wards of Botshabelo District Hospital during the study period.
- 1.6.2.3 To document trends in the average length of stay (ALOS) for patients admitted to Botshabelo District Hospital medical wards during the study period.
- 1.6.2.4 To determine the outcomes of patients admitted at Botshabelo District Hospital medical wards during 2006-2008.
- 1.6.2.5 To determine causes of mortality of patients admitted at Botshabelo District Hospital medical wards during 2006-2008.

CHAPTER 2

METHODOLOGY AND PROCEDURES

2.1. SETTING OF THE STUDY

The setting of this study was the two medical wards (male and female) of the Botshabelo District Hospital.

2.2. SCOPE OF THE STUDY

This study was based on a retrospective record review of patients admitted at Botshabelo District Hospital, and the information was obtained from the Admission and Discharge Registers and patient records.

2.3. STUDY DESIGN

The study is a descriptive, cross-sectional study of patients admitted in the medical wards of Botshabelo District Hospital.

2.4. STUDY PERIOD

The study period was between 2006 and 2008.

2.5. STUDY POPULATION

The study population included all patients admitted to the Botshabelo District Hospital adult medical wards during 2006 – 2008.

2.6. INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria

- Patients admitted to the medical wards from the 1st January 2006 to 31st December 2008.
- The patients who were allocated to a bed and she/he spent at least one inpatient day in the hospital, and were counted in the midnight returns.

Exclusion criteria

- Day patients because they are not admitted and therefore not counted on the midnight returns.
- Patients in the medical wards who are 12 years and younger because they are not classified as adults.
- All outpatients.
- Patients admitted in the surgical, maternity and paediatric wards.

2.7. STUDY SAMPLING

Systematic sampling was done by extracting data from the admission and discharge adult medical ward registers. The Admission Register for each year provided a sampling frame. The total number of adult medical admissions was 2402 in 2006, 2330 in 2007 and 2498 in 2008. Every tenth medical patient was selected to obtain a sample size of approximately 10% of the total number of admissions per year. This was based on the assumption that 40% of admissions would be as a result of HIV/AIDS.

Using Statcalc from EpiInfo, a sample size of 159 would be required for an expected frequency of 40%, with the worst acceptable result of 50%, at a confidence level of 99%.

When there were deficiencies in the completeness of data e.g. admission date omitted or outcome not recorded, the next qualifying admission with full details was selected. A total number of 703 admissions were selected and analysed.

2.8. DATA MANAGEMENT

2.8.1. Data sources and collection

Data was collected from the admissions, discharge and death registers and patient records, for patients admitted during 2006 - 2008 in the adult medical wards.

The registers were collected from the sister-in-charge of the respective wards. The researcher obtained the necessary information from the registers using the data collection tools. Discrepancies in the data collection and entry were checked and validation of the information was done by the researcher on a daily basis.

To identify the cause of death in patients who were deceased, the hospital numbers of patients were recorded from the admission registers. The cause of death was obtained from the death register or from the patient records using this hospital number. The hospital number was not captured into the database for analysis.

2.8.2. Data collection tool

Data was collected using the designed tool. (Appendix 1).

2.8.3. Variables

Data was collected on the variables listed in Table 1.

Table 1: List of variables

Objectives	Variables
Trends	Number of admissions Date of admission Date of outcome (discharge, transfer out or death)
Patient profile	Age Sex Race Address
Disease profile	Diagnosis HIV status Primary cause of death
Determine outcomes of patients admitted	Discharges Deaths Transfers

The following variables were generated from information obtained in the dataset:

- Patient's area of residence: obtained from last three digits of the patient's hospital number as the township area that the patient lives in forms part of the hospital number.
- Length of stay (LOS): This was calculated using the date of admission and the date of outcome of each patient.
- ICD diagnosis: Data on the diagnosis was recoded using the ICD 10 coding system (Appendix 2).

2.8.4. Data Analysis

The researcher entered the information onto the database (Excel). The data was cleaned and discrepancies were corrected. The information was put into the Excel spreadsheet in order to be imported into Epi-Info 8 for analysis.

The following statistical analysis was done using Epi-Info:

Patient Profile

The age and sex profile described the ages and sexes among the patients admitted. The central measurement tendencies using the mean and the median were calculated as the distribution of age was skewed. The range was also calculated for age. ANOVA testing was used to identify significant differences in age across years. A p-value of 0.05 was considered to be significant.

The frequency and percentage were calculated for male and female patients. Chi square tests were done to test the association between sex and year of admission. A p-value of 0.05 was considered to be significant.

Admission rates

Admission trends were calculated using frequencies and percentages, noting increases and decreases.

Disease and Mortality Profile

Causes of disease and mortality were categorised by year of admission and grouped according to the top ten causes. Specific consideration was given to HIV/AIDS. The frequency and percentages were calculated and Chi square or Fisher Exact tests, where required, were done to identify significant differences across the years. The association between ICD 10 diagnosis and HIV status was tested using a Fisher Exact test. A p-value of 0.05 was considered to be significant.

Average length of stay

The mean, median and range for length of stay were calculated. ANOVA testing was used to identify significant differences across years and disease profiles. A p-value of 0.05 was considered to be significant.

Outcome

Information on discharges, transfers to other institutions or death was collected. The frequency and percentages were calculated and a Chi square test was done to identify significant differences across the years. The association between mortality and HIV status was tested using a Fisher Exact test. For both of these tests, a p-value of 0.05 was considered to be significant.

Factors associated with mortality as an outcome was assessed using logistic regression methods. A p-value of 0.05 was considered to be significant. Age, sex, ICD diagnosis, area of residence and year of admission was tested for significance using univariate models. All variables that were found to be significant were included in the final multivariate model.

2.9. PILOT STUDY

A pilot study of 30 files was done in the paediatric ward within the study period 2006-2008. The paediatric ward was chosen for the pilot because almost all medical conditions are also present in the paediatric ward. The purpose was to test the data collection tool. The designed data collection tool was used by the researcher to collect the data. The findings were applicable and the tool did not need to be changed.

2.10. ETHICS APPRAISAL

No primary data collection was done for this study. No intervention was done as a part of this study. Permission to conduct the research was requested and obtained from the Department of Health Free State (Appendix 3) and the Ethics Committee of University of the Witwatersrand (Appendix 4).

Confidentiality of information was maintained by not using patients' names. Data was coded e.g. instead of a name, a code was used. Data on causes of death was

collected by using the patient's registration number and retrieving the individual record. During the analysis no identifying information was used, and registration numbers were coded into numbers.

CHAPTER 3

RESULTS

In this chapter, results of the analysis from the study are presented in tables and graphs.

3.1. ADMISSIONS

A total of 703 admissions were selected through systematic sampling. In 2006, two hundred and fifty (250) patients were selected, three hundred and four (304) in 2007 and one forty nine (149) records in 2008.

Generally record keeping of registers reflected incomplete data on some variables that needed to be measured, resulting in such subjects being skipped and the next correct one being selected. In Table 1 it is noted that the actual number of admissions showed a decline in 2007.

Table 2: Admission trends per year and sample collected

Years	Total	2006	2007	2008
Total number of actual medical admissions	7230	2402	2330	2498
Sample of admissions	703	250	304	149
Percentage change in admissions		-	-3.7%	+7.2%

3.2. DEMOGRAPHIC PROFILE OF PATIENTS ADMITTED

3.2.1 GENDER AND AGE

The mean age of the respondents was 45.3 years. However, the data was skewed by one admission that was an outlier of age 104 years and therefore the median provides a better measure of the age of patients who were admitted. The median age of admissions was 41.5 years. The ages of patients ranged from 13 years to 104 years respectively.

The gender distribution of participants was not significantly different for both sexes (56.3% for males and 43.7% for females). More males than females were admitted for the period of study, and there was a significant drop in female admissions from 54.4% in 2006 to 32.4% in 2008 (p value = 0.0000).

All admissions were Africans although there is no restriction of race to the hospital.

Table 3: Gender and age (N=703)

	Total	2006 (N=250)	2007 (N=304)	2008 (N=149)	p value
Sex [n (%)]					
Females	307 (43.7%)	136 (54.4%)	123 (40.5%)	48 (32.4%)	0.0000
Males	396 (56.3%)	114 (45.6%)	181 (59.5%)	101 (67.8%)	
Age (in years)					
Mean (SD)	45.3 (17.4)	43.9 (17.4)	46.9 (17.4)	44.2 (17.1)	0.0916
Median	41.5	39.5	43.0	40.0	
Range	13 - 104	16 - 95	15 - 95	13 - 104	

Figure 2 shows that 26% respondents were between the ages of 25 – 34. Only 1 (0.1%) respondent was 13 years old.

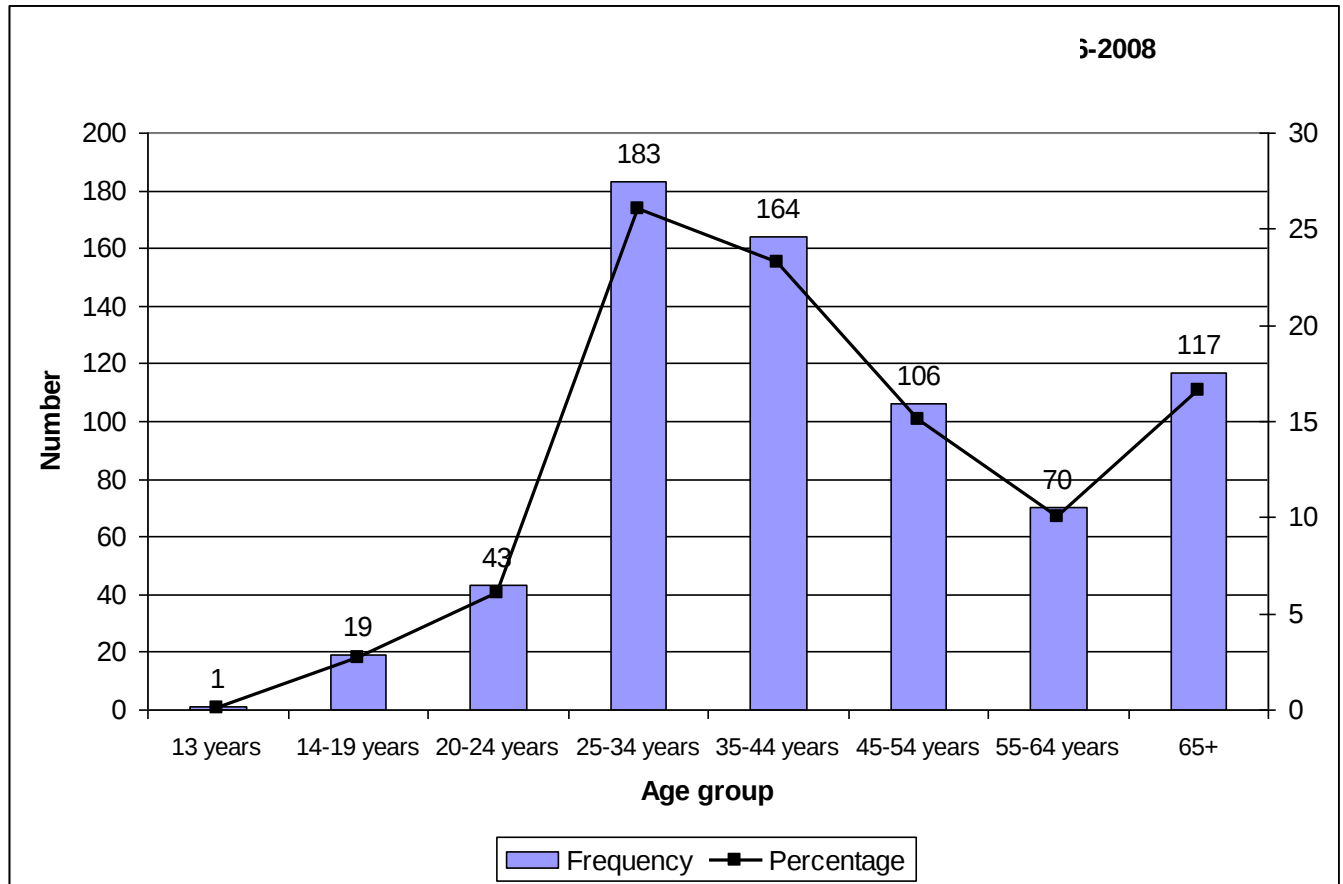


Figure 2: Age distribution of patients admitted to Botshabelo Hospital (2006 – 2008) (N=703)

3.3. AREA OF ORIGIN OF PATIENTS ADMITTED

The collected data for area of origin is presented in a combined manner, not per year of study. Most of the patients admitted (14.4%) were from F-section, and the least (1.1%) were from V-section which was a newly developing area at the time of the study. The areas that are closest to Botshabelo District Hospital are sections C, G and J-section. The category titled “other” refers to people residing outside of the Botshabelo district but who were admitted at the hospital during the

study period and were identified from the Admission Register. A-section is the oldest section where the township started, while H-section is the elite section composed mostly of young working class. Table 4 reflects the admissions according to their residential areas

Table 4: Area of residence of patients admitted to Botshabelo Hospital (2006 – 2008) (N=703)

Area	n (%)
A	49 (7.0%)
B	28 (4.0%)
C	63 (9.0%)
D	29 (4.1%)
E	26 (3.7%)
F	101 (14.4%)
G	27 (3.8%)
H	45 (6.4%)
J	44 (6.3%)
K	51 (7.3%)
L	42 (6.0%)
M	24 (3.4%)
N	25 (3.6%)
Other	4 (0.6%)
S	27 (3.8%)
T	35 (5.0%)
U	43 (6.1%)
V	8 (1.1%)
W	32 (4.6%)

3.4. ADMISSION DIAGNOSES OF PATIENTS ADMITTED

Table 5 reflects the diagnosis of the patients on admission. Some had more than one diagnosis. Most patients were admitted with pulmonary tuberculosis (21.7%), and HIV (15.8%), followed by pneumonia (13%) and congestive cardiac failure (9.1%).

Table 5: Admissions by diagnosis of patients admitted to Botshabelo District Hospital

	Primary diagnosis (N=703)	Secondary diagnosis (N=228)	Total (N=931)
Pulmonary tuberculosis	159 (22.6%)	43 (18.9%)	202 (21.7%)
HIV	136 (19.3%)	11 (4.8%)	147 (15.8%)
Pneumonia	55 (7.8%)	66 (28.9%)	121 (13.0%)
Congestive Cardiac Failure	77 (11.0%)	8 (3.5%)	85 (9.1%)
Hypertension	42 (6.0%)	16 (7.0%)	58 (6.2%)
Diabetes Mellitus	44 (6.3%)	12 (5.3%)	56 (6.0%)
Meningitis	37 (5.3%)	6 (2.6%)	43 (4.6%)
Cerebro-vascular Accident	36 (5.1%)	7 (3.0%)	43 (4.6%)
Gastroenteritis	16 (2.3%)	12 (5.3%)	28 (3.0%)
Anaemia	11 (1.6%)	10 (4.3%)	21 (2.3%)
Pleural Effusion	16 (2.3%)	1 (0.4%)	17 (1.8%)
Liver Failure	15 (2.1%)	1 (0.4%)	16 (1.7%)
Renal Failure	13 (1.8%)	3 (1.3%)	16 (1.7%)
Asthma	12 (1.7%)	4 (1.8%)	16 (1.7%)
Respiratory Tract Infection	9 (1.3%)	3 (1.3%)	12 (1.3%)
Tuberculous Meningitis	8 (1.1%)		8 (0.9%)
Pulmonary Oedema	4 (0.6%)	2 (0.9%)	6 (0.6%)
Dehydration		4 (1.8%)	4 (0.4%)

Miliary tuberculosis	3 (0.4%)		3 (0.3%)
Ascitis	1 (0.1%)	2 (0.9%)	3 (0.3%)
PCP		3 (1.3%)	3 (0.3%)
Gastritis	2 (0.3%)		2 (0.2%)
Pancreatitis	2 (0.3%)		2 (0.2%)
Haemoptysis	1 (0.1%)	1 (0.4%)	2 (0.2%)
Jaundice		2 (0.9%)	2 (0.2%)
MDRTB		2 (0.9%)	2 (0.2%)
TB		2 (0.9%)	2 (0.2%)
Encephalitis	1 (0.1%)		1 (0.1%)
Epistaxis	1 (0.1%)		1 (0.1%)
Haematemesis	1 (0.1%)		1 (0.1%)
Tuberculous Peritonitis	1 (0.1%)		1 (0.1%)
Ex-PTB		1 (0.4%)	1 (0.1%)
Lung abscess		1 (0.4%)	1 (0.1%)
Pellagra		1 (0.4%)	1 (0.1%)
Pylonephritis		1 (0.4%)	1 (0.1%)

Figure 3 shows the top ten diseases leading to admissions, while Table 5 presents the same information for the three years (2006 – 2008).

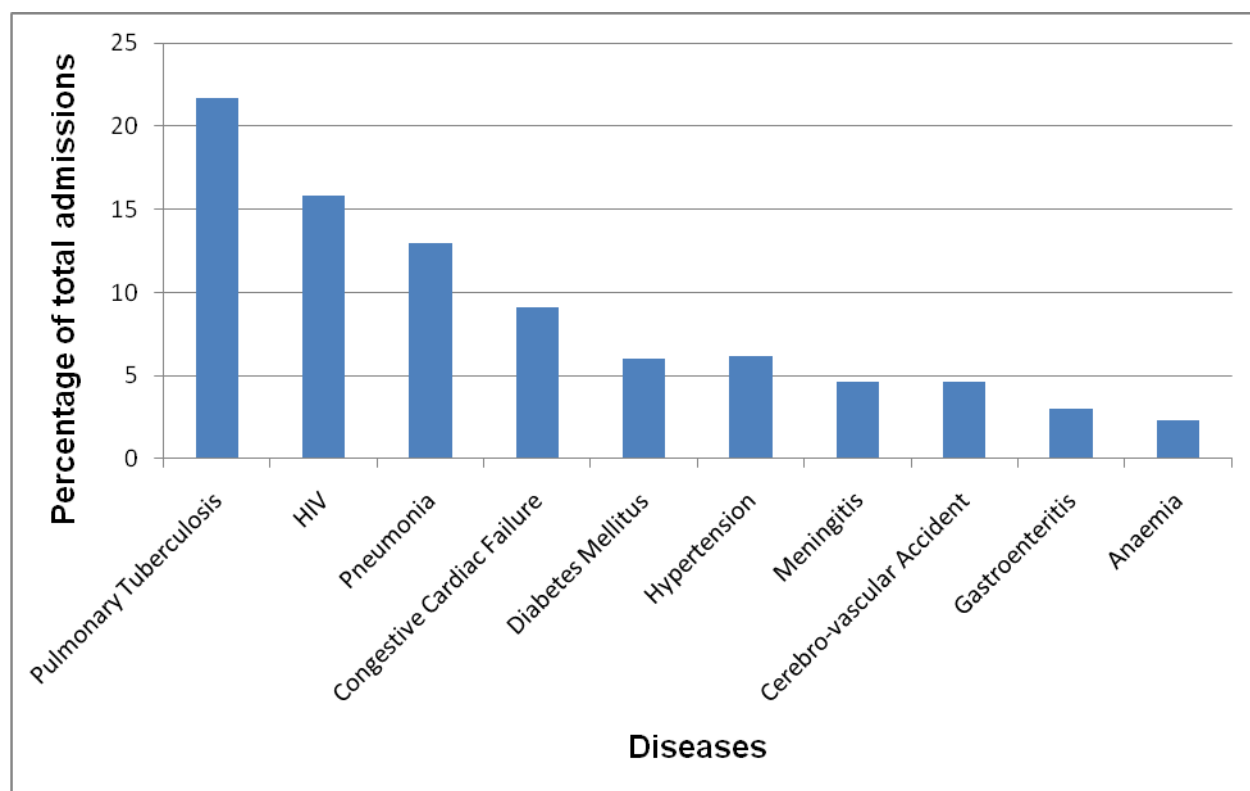


Figure 3: Top ten diseases resulting in admissions at Botshabelo District Hospital

Table 6 presents the top ten diseases that were a cause of admission in each of the three years. HIV and pulmonary tuberculosis were in the top three causes but non-communicable diseases such as cardiovascular and diabetes mellitus also featured high in the list.

Table 6: Top 10 diseases resulting in admission per year

2006 (N=250)	n (%)	2007 (N=304)	n (%)	2008 (N=149)	n (%)
HIV	84 (33.6%)	PTB	79 (26.0%)	PTB	34 (23.0%)
PTB	46 (18.4%)	CCF	39 (12.8%)	Pneumonia	21 (14.2%)
CCF	23 (9.2%)	HIV	35 (11.5%)	HIV	17 (11.5%)
DM	17 (6.8%)	Meningitis	23 (7.6%)	CCF	15 (10.1%)
Pneumonia	15 (6.0%)	CVD	21 (6.9%)	DM	9 (6.1%)
HT	15 (6.0%)	Pneumonia	19 (6.3%)	HT	8 (5.4%)
CVD	8 (3.2%)	DM	18 (5.9%)	CVD	7 (4.7%)
Meningitis	8 (3.2%)	HT	18 (5.9%)	Gastro	6 (4.1%)
Pleural effusion	6 (2.4%)	Pleural effusion	8 (2.6%)	LRTI	6 (4.1%)
Anaemia/Asthma/ Liver disease/Renal failure	4 (1.6%)	Liver disease	8 (2.6%)	Meningitis	6 (4.1%)

* LRTI: Lower respiratory tract infection

Table 7 with the ICD 10 Code classification according to diagnosis showed that diseases of the respiratory system were the highest (36.3%), followed by diseases of the circulatory system (22.8%) and HIV (19.4%).

Table 7: Diagnosis according to the ICD 10 Code for patients admitted to Botshabelo Hospital (2006 – 2008) (N=703)[#]

	Total	2006 (N=250)	2007 (N=304)	2008 (N=149)	p value
Human immunodeficiency virus diseases	136 (19.4%)	84 (33.6%)	35 (11.5%)	17 (11.5%)	0.000
Disease of the respiratory system	255 (36.3%)	75 (30.0%)	113 (37.2%)	67 (45.3%)	
Diseases of the circulatory system	160 (22.8%)	46 (18.4%)	81 (26.6%)	33 (21.7%)	
Diseases of the nervous system	46 (6.6%)	8 (3.2%)	29 (9.5%)	9 (6.6%)	
Endocrine, nutritional, metabolic disorders	46 (6.6%)	18 (7.2%)	19 (6.3%)	9 (6.1%)	
Diseases of the digestive system	35 (5.0%)	11 (4.4%)	13 (4.3%)	11 (7.4%)	
Diseases of the genitourinary system	13 (1.9%)	4 (1.6%)	7 (2.3%)	2 (1.4%)	
Haematological disorders	12 (1.7%)	4 (1.6%)	7 (2.3%)	12 (1.7%)	

[#]Fisher Exact test used

3.5. HIV STATUS

Just less half of the patients (45.7%) admitted had an unknown HIV status, but this was much higher in 2007 (57.2%). Positive HIV admissions increased from 38.8% in 2006 to 47.0% in 2008.

Table 8: HIV Status of patients admitted to Botshabelo Hospital (2006 – 2008) (N=703)

YEAR	Total	2006 (N=250)	2007 (N=304)	2008 (N=149)	p value
Positive	250 (35.6%)	97 (38.8%)	84 (27.6%)	70 (47.0%)	0.0000
Negative	132 (18.8%)	55 (22.0%)	46 (15.1%)	30 (20.1%)	
Unknown	321 (45.7%)	98 (39.2%)	174 (57.2%)	49 (32.9%)	

Just over half (54.1%) of HIV positive patients were recorded to have HIV as a primary diagnosis, while more than a third of HIV positive patients (37.1%) were coded to have diseases of the respiratory systems according to the ICD 10 classification system (Table 9).

Table 9: HIV status according to ICD 10 Code Diagnosis for patients admitted to Botshabelo Hospital (2006 – 2008) (N=703)[#]

	HIV status			
	Positive (N=250)	Negative (N=132)	Unknown (N=321)	p value
Diseases of the circulatory system	3 (1.2%)	12 (9.2%)	144 (45.0%)	0.000
Disease of the respiratory system	93 (37.1%)	89 (67.9%)	73 (22.8%)	
Haematological disorders	4 (1.6%)	1 (0.8%)	7 (2.2%)	
Endocrine, nutritional, metabolic disorders	2 (0.8%)	4 (3.1%)	40 (12.5%)	
Diseases of the digestive system	9 (3.6%)	6 (4.6%)	20 (6.3%)	
Human immunodeficiency virus diseases	136 (54.2%)	0 (0.0%)	0 (0.0%)	
Diseases of the genitourinary system	0 (0.0%)	7 (5.3%)	6 (1.9%)	
Diseases of the nervous system	4 (1.6%)	12 (9.2%)	30 (9.4%)	

[#]Fisher Exact test used

3.6. AVERAGE LENGTH OF STAY

The average length of stay (ALOS) is presented in Table 10 and Figure 4. The ALOS for all patients was five days, with a range of one to nine days.

Table 10: Average length of stay (ALOS) of patients admitted to Botshabelo District Hospital (2006 – 2008) (N=703)

Year	Total	2006 (N=250)	2007 (N=304)	2008 (N=149)	p value
ALOS (in days)					
Mean (SD)	5.0 (2.2)	4.8 (2.1)	5.2 (2.1)	4.8 (2.2)	0.0278
Median	5.0	5	6.0	5	
Range	1 - 9	1 - 9	1-9	1-9	

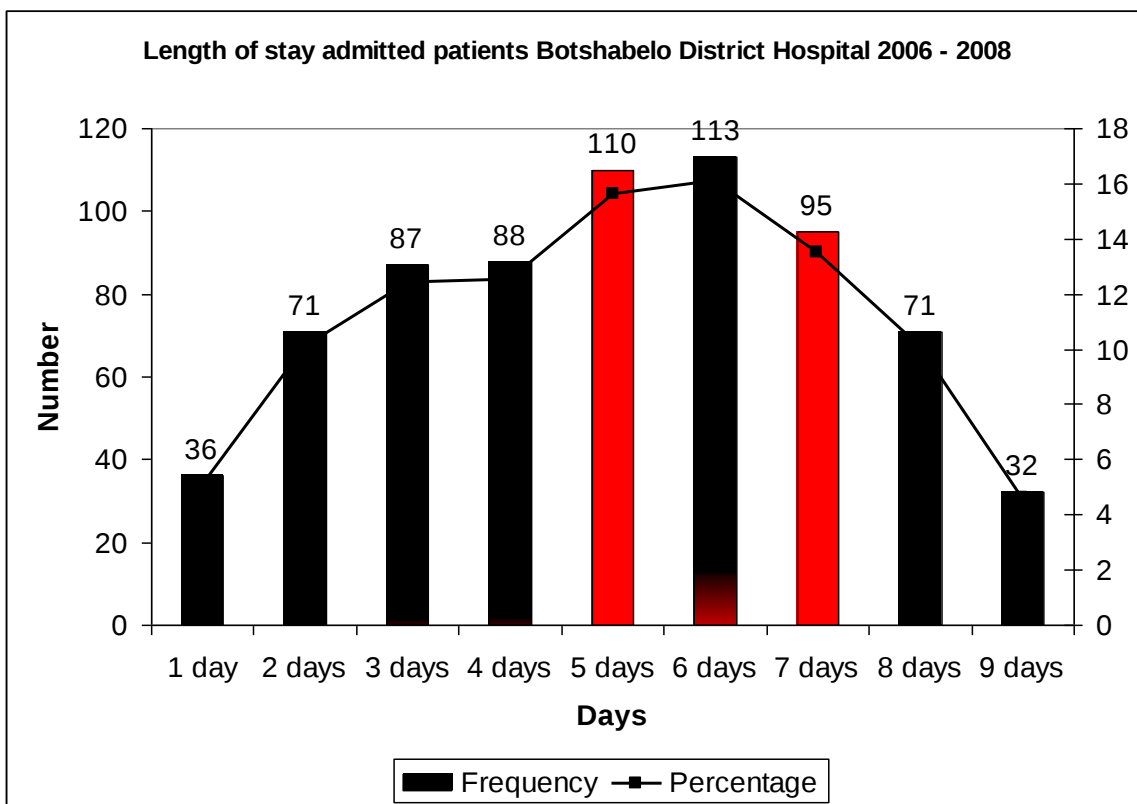


Figure 4: Length of stay of patients admitted to Botshabelo District Hospital (2006 – 2008)

3.7. OUTCOMES OF PATIENTS

Table 11 presents the outcomes of patients admitted at Botshabelo District Hospital. The number of deaths has significantly increased from 2006 (38.8%) to 2008, where more than half of the patients who were admitted died (54.7%). There were a high number of discharges in 2007.

Table 11: Outcomes of patients admitted at Botshabelo District Hospital (2006-2008) (N=703)

Years	Total	2006 (N=250)	2007 (N=304)	2008 (N=149)	p value
Deaths	265 (37.7%)	97 (38.8%)	87 (28.6%)	81 (54.7%)	0.0000
Discharges	377 (53.6%)	134 (53.6%)	182 (59.9%)	61 (40.5%)	
Transfers	61 (8.7%)	19 (7.6%)	35 (11.5%)	7 (4.7%)	

The association between outcomes of patients and HIV status is presented in Table 12. More than half of the patients who died (54.0%) had a positive HIV status, and in over a third (36.6%) of the deaths the HIV status was unknown.

Table 12: Outcomes of patients admitted to Botshabelo District Hospital by HIV Status (N=703) [#]

HIV Status	Deaths (N=265)	Discharges (N=377)	Transfers (N=61)	p value
Positive	143 (54.0%)	105 (27.9%)	3 (4.9%)	0.0000
Negative	25 (9.4%)	89 (23.7%)	17 (27.9%)	
Unknown	97 (36.6%)	182 (48.4%)	41 (67.2%)	

[#]Fisher Exact test used

3.8. CAUSES OF MORTALITY

The primary causes of mortality as recorded in the death register or patient records are presented in Table 13. Over a fifth of the deaths (21.1%) were recorded as AIDS related.

Table 13: Primary causes of death of patients admitted to Botshabelo District Hospital by HIV Status (N=703)

Cause of death	n (%)
AIDS Related	53 (21.1%)
Pneumonia	42 (16.7%)
Cerebrovascular disease	31 (13.0%)
Pulmonary tuberculosis	32 (12.6%)
Gastro-enteritis	21 (8.4%)
Congestive Cardiac Failure	18 (7.2%)
Meningitis	13 (5.2%)
Respiratory Failure	12 (4.8%)
Diabetes Mellitus	11 (4.4%)
Renal Failure	10 (4.0%)
Liver diseases	8 (3.2%)
Pulmonary oedema	7 (2.8%)
Encephalitis	3 (1.2%)

3.9. FACTORS ASSOCIATED WITH MORTALITY

Table 14 presents the results of the logistic regression modelling. On the univariate analysis increasing age, female sex, being admitted in 2008, and having a diagnosis of HIV or blood disorders was found to be significantly associated with mortality. All of these variables were included in the multivariate analysis. In this model, there appears to be a significant “dose-response” association between increasing age and the odds of dying. Females had a 1.55 (95% Confidence interval 1.09 – 2.19) greater odds of dying than male patients. Patients who were admitted in 2008 had a 3.32 (95% Confidence interval 2.07 – 5.32) greater odds of dying than patients admitted in 2006. Patients admitted with HIV, blood disorders and digestive disorders were found to have a significantly greater odds of dying than patients who were admitted with circulatory disorders (reference group). Admitted patients that resided in the H-section were found to have significantly lower odds (OR 0.36, 95% Confidence interval 0.13 – 0.99) of dying than patients who resided in the A-section.

Table 14: Factors associated with mortality in patients admitted to Botshabelo District Hospital (N=703)

	Univariate OR (95% CI*)	p value	Multivariate OR (95% CI*)	p value
Age				
< 20	1.00		1.00	
20 – 29	<u>6.19 (1.37 – 27.98)</u>	0.0179	<u>5.93 (1.24 – 28.13)</u>	0.0251
30 – 39	<u>5.27 (1.19 – 23.33)</u>	0.0286	<u>5.49 (1.18 – 25.48)</u>	0.0296
40 – 49	4.12 (0.91 – 18.63)	0.0659	4.70 (0.99 – 22.36)	0.0515
50 – 59	<u>5.86 (1.30 – 26.51)</u>	0.0216	<u>9.08 (1.89 – 43.57)</u>	0.0058
60 – 69	<u>5.17 (1.12 – 23.97)</u>	0.0358	<u>10.74 (2.23 – 54.22)</u>	0.0040
>70	<u>9.75 (2.11 – 44.93)</u>	0.0035	<u>18.79 (3.74 – 94.36)</u>	0.0004
Sex				
Male	1.00		1.00	
Female	<u>1.45 (1.06 – 1.97)</u>	0.0179	<u>1.55 (1.09 – 2.19)</u>	0.0145
ICD diagnosis				
Circulatory	1.00		1.00	
HIV	<u>2.40 (1.50 – 3.84)</u>	0.0003	<u>4.93 (2.66 – 9.15)</u>	0.0000
Blood	<u>3.68 (1.06 – 12.76)</u>	0.0401	<u>5.97 (1.51– 23.57)</u>	0.0107
Endocrine	0.72 (0.35 – 1.49)	0.3802	0.78 (0.36 – 1.67)	0.5220
Nervous	0.80 (0.40 – 1.63)	0.5471	1.72 (0.75 – 3.93)	0.1975
Respiratory	0.77 (0.50 – 1.17)	0.2170	1.22 (0.71 – 2.07)	0.4734
Digestive	1.55 (0.74 – 3.25)	0.2468	<u>2.49 (1.08 – 5.77)</u>	0.0326
Genitourinary	1.58 (0.51 – 4.92)	0.4330	2.33 (0.70 – 7.73)	0.1659
Year				
2006	1.00		1.00	
2007	<u>0.63 (0.44 – 0.90)</u>	0.0116	0.85 (0.57 – 1.27)	0.4307
2008	<u>1.91 (1.26 – 2.88)</u>	0.0021	<u>3.32 (2.07 – 5.32)</u>	0.0000
Area of residence				
A	1.0		1.0	

B	1.23 (0.48 – 3.11)	0.6662	1.07 (0.39 – 2.95)	0.8921
C	0.81 (0.38 – 1.72)	0.5792	0.87 (0.38 – 1.98)	0.7390
D	0.79 (0.31 – 2.04)	0.6324	0.80 (0.29 – 2.22)	0.6681
E	<u>0.29 (0.09 – 0.90)</u>	<u>0.0322</u>	0.42 (0.13 – 1.38)	0.1514
F	1.53 (0.77 – 3.03)	0.2264	1.46 (0.68 – 3.11)	0.3318
G	0.72 (0.28 – 1.89)	0.5071	0.82 (0.29 – 2.34)	0.7168
H	<u>0.31 (0.12 – 0.77)</u>	<u>0.0120</u>	<u>0.36 (0.13 – 0.99)</u>	<u>0.0476</u>
J	0.46 (0.19 – 1.10)	0.0804	0.51 (0.20 – 1.30)	0.1599
K	0.73 (0.33 – 1.62)	0.4378	0.81 (0.34 – 1.94)	0.6364
L	0.49 (0.20 – 1.18)	0.1109	0.51 (0.20 – 1.33)	0.1701
M	0.61 (0.22 – 1.70)	0.3473	0.76 (0.25 – 2.30)	0.6224
N	0.69 (0.26 – 1.86)	0.4640	0.94 (0.32 – 2.78)	0.9147
Other	1.23 (0.16 – 9.43)	0.8440	1.27 (0.14 – 11.97)	0.8336
S	0.72 (0.28 – 1.89)	0.5071	1.01 (0.36 – 2.87)	0.9799
T	0.49 (0.19 – 1.24)	0.1315	0.63 (0.23 – 1.70)	0.3591
U	0.73 (0.32 – 1.68)	0.4554	0.93 (0.37 – 2.31)	0.8767
V	1.23 (0.28 – 5.48)	0.7884	1.12 (0.20 – 6.21)	0.8962
w	0.64 (0.26 – 1.62)	0.3473	0.94 (0.34 – 2.59)	0.9086

*CI: Confidence interval

All significant results are underlined.

CHAPTER 4

DISCUSSION

4.1. INTRODUCTION

This chapter describes the results found from the analysis of the data obtained in the study: the trends in admissions, most common diseases that led to patients being admitted in the district hospital and what eventually happened to patients that were admitted. This is also compared with findings published in other studies.

There were no previous studies conducted on trends in medical admissions at this district hospital or in the Free State Province. The resources and skills at district hospital level are not like those of a regional hospital which has specialised skills and sophisticated or advanced technology. District hospitals receive referrals from primary health care clinics and self referred patients from communities.

4.2. CASE RETRIEVAL

Findings of this report were derived from a record review of admissions done at Botshabelo District Hospital over a period of three years (2006-2008). Seven hundred and three patients were selected from Admission and Discharge Registers. There are two major events that happened in Botshabelo District Hospital which could have affected the study findings. Firstly, in 2007 there was an industrial action (strike and go-slow) which lasted over a period of three months. Following the industrial action, there was an exodus of personnel in the form of staff turnover (resignations, transfers and gaining employment overseas). This could have affected the admission of patients during the study period in 2007 as less staff were available in the wards to manage patients. The hospital also experienced a shortage of doctors, which affected the clinical care of patients.

In the study it was found that there were fewer admissions in 2007 and a higher percentage of discharges, while patients stayed longer in the wards. In 2007 it was also noted that more patients were admitted with an unknown HIV status. It is thus clear that problems in service delivery and that health system issues impact on the quality of care provided.

4.3. ADMISSIONS

Admissions to hospital may be influenced by various factors. It could reflect the disease burden, and it can also be influenced by health systems factors, for example, availability of staff, drugs, equipment and diagnostic facilities. The level of care of the facility, referral pathways can also influence the admission rates. Quality of care provided can make a difference as patients may seek care at some facilities. Finally, admission rates can be influenced by health-care provider interest, e.g. someone might have interest in tuberculosis or breast cancer and admit more patients with these conditions, or more patients may be referred to them because they are an expert. Finally, admission rates can be influenced by health-care user preferences, e.g. influence from patient right charter; i.e. the right to exercise a choice to use a health facility.

Trends in admissions may show increases or declines; however the increases or decreases in admissions is affected by many factors that may vary from one hospital to the other. This includes factors such as demographics and disease patterns. The general disease burden is inclined to have changes in disease patterns and there may be an interaction of diseases. The impact of HIV/AIDS and the diseases of modern life have an influence on the admission rates in hospitals. The general admissions from 2006-2008 in Botshabelo District Hospital showed an increase of 2% (2402 in 2006 – 2498 in 2008). In Botshabelo District Hospital the following events occurred during the period of the study: in 2006 an antiretroviral treatment site was opened at the hospital and some surrounding clinics. The uptake might have affected the admission rate. This was followed by

an industrial action in 2007, which lasted for approximately three months, which may have affected the admission rates negatively.

HIV/AIDS, especially, plays a significant role in numbers of admissions and causes of deaths and is a common co-infection of hospitalised medical patients. Although it was not possible in this study to test for a significant increase in admissions, one has to consider the factors that occurred in 2007 (strike and staff turnover), and although one is not sure of the impact it had on admissions, it does appear to have resulted in a decline in admissions. However, the high percentage of admissions due to TB and HIV/AIDS indicates a need for more resources or strategies to curb the demand for more admissions.

The findings of this can be compared in some way to findings obtained from a study conducted at Hlabisa Hospital, a rural hospital in KZN district, where an increase of 275% over a period of twelve years was reported, which was said to have been influenced by the rise in tuberculosis infection (Reid et al. 2005). In contrast, a community hospital in Israel reported no significant change in the rate of admissions over an 11 year study period (Stein and Zeidman, 2006).

There appears to be an increase in the need for hospitalisation at Botshabelo District Hospital. What is uncertain is whether, with the increase in admissions, are resources sufficient to provide quality care or carry the load?

4.3.1. GENDER

There was an increase in the number of male admissions (56.3%), while there was a constant significant decrease among female admissions (54.4% in 2006, 40.5% in 2007 and 32.4% in 2008). It is unclear why this has occurred but one reason may pertain to HIV and the commencement with anti-retroviral treatment. At Botshabelo District Hospital, the ART programme commenced in 2006. Females on ART outnumber male patients. It is possible that the impact of ART

has had an effect on the health of females but this would need to be formally assessed and researched.

These findings are different from other studies, where there was no great difference in gender regarding admissions (Sanya et al., 2008), or furthermore in rural areas the situation is different in that the majority of admissions were found to be females. Due to the poor socio-economic and health conditions in such areas, female admissions and morbidity tends to be higher. For example, in Blantyre Hospital, Malawi, a study showed an increase of HIV infection among young women who were mostly previously infected by their then deceased partners (Lewis et al. 2003).

In this study the decline in female admissions reflects a stark contrast to the factors found to be significantly associated with mortality. Female patients had a significantly greater odds of dying during their admission than male patients both in the univariate (OR 1.45 95% CI 1.06-1.97) and multivariate analysis (OR 1.55 95% CI 1.09-2.19).

4.3.2. AGE

The ages of patient in this study ranged between 13 years and 104 years. The study showed ages of admission being mostly between 25 to 45 years, with a mean age of 45.3 and the median 41.5 years. In this study, as with other studies conducted in the country, it was found that the younger population were more affected, and they are supposed to be the prospective population to rely upon in terms of the economy of the country (Reid et al. 2005). In a study carried out in Israel most of the admissions were between 65 and 74 years of age but these were not HIV related, but rather mostly patients with ischaemic heart diseases (Stein and Zeidman, 2006). In Malawi at Blantyre Hospital ages of admitted patients ranged between 31 and 40years.

In the GF Jooste Hospital in Cape Town, the range of ages for patients admitted was between 13 years and 87 years, with admissions between 20 to 30 years predominating. One can say this is a trend in the contemporary situation where the youth are the most affected by diseases like HIV/TB infections (Marszalek and De Villiers, 2006). This is worrisome as the affected age is the economically viable population, and within childbearing age, meaning that this will affect the health status of a population negatively (Marszalek and De Villiers, 2006).

4.3.3. AREA OF ORIGIN

One would expect that patients admitted to Botshabelo District Hospital would mostly be from the nearest areas (C, G and J-section) however, the highest number of admissions to Botshabelo District Hospital was from F-section. V-section was just starting to develop at the time of study, and hence did not have a lot of admissions. The reason for F-section having the highest number of admissions in hospital could be due to the fact that it has the largest population. F-section has 5000 to 6000 houses and is still expanding.

4.3.4. NON-COMMUNICABLE DISEASES

Non-communicable diseases are now becoming a public health challenge. During the 1990s, worldwide, non-communicable diseases accounted for 28.1 million deaths, which were caused by ischaemic heart disease, cerebrovascular disease, and respiratory disease. The probability of men and women dying from non-communicable diseases is higher in the Sub-Saharan Africa and other developing regions than in established market economies (Murray and Lopez, 1997). Non-communicable diseases were found to be among the top ten causes of admission in this study.

Results in other studies of hospital admissions in cities and towns revealed the influence of urbanisation and westernisation of the population, where circulatory

system disorders are among those dominating in the medical wards (Marszalek and De Villiers, 2006). A study done in Zimbabwe's Mpilo Central Hospital in Bulawayo reported that there was an increase in mortality due to non communicable diseases, such as CCF, stroke and diabetes mellitus (Bardgett, Dixon & Beeching, 2006). In Botshabelo District Hospital, non-communicable diseases resulted in over a third (34.6%) of the deaths in the wards (cerebrovascular diseases – 13%, CCF – 7.2%, diabetes mellitus – 4.4%, renal failure - 4%, liver diseases – 3.2%, and pulmonary oedema – 2.8%).

4.3.5. COMMUNICABLE DISEASES (HIV/AIDS and TB)

Reasons for hospitalisation showed a list of different diseases. HIV/AIDS and tuberculosis have been diseases of concern as they showed a continuous increase in prevalence and cause of admission. Over the study years, HIV was top at 33.6% in 2006 and declined in 2007 and 2008, where tuberculosis was number one at 26.0% and 23.0% respectively. The effect of the introduction of ART in 2006 may have caused the decrease in HIV as a reason for admission, although there is strong co-morbidity between HIV/AIDS and TB.

This study also revealed that only some patients were diagnosed with HIV primarily, while others were found to be HIV positive either as a secondary diagnosis or when they were treated for other diseases. HIV is still a stigma and the confidentiality issue may have lead to it not being freely reflected on the patients' information, e.g. when patients die. When HIV is the main cause of death the medical officers rather put the direct cause of death, e.g. dehydration.

TB is among the highest causes of morbidity and mortality globally; the incidence of TB has increased due to its co-infection with HIV/AIDS (Abdool Karim et al. 2009). In South Africa the burden of disease due tuberculosis is a huge problem; it is actually one of the worst epidemics in the world. South Africa has a population of 482,000 people living with tuberculosis, of which 70% are co-infected with

HIV/AIDS. The TB cure rate was 58% and there were 105,000 deaths annually due to TB (Abdool Karim et al. 2009). TB patients co-infected with HIV are likely to have higher rates of mortality (Abdool Karim et al. 2009). Other factors associated with TB are poverty, unemployment and drug resistance (Abdool Karim et al. 2009).

4.4. MORTALITY

Information on the causes of deaths and the impact thereof is essential in the management of health care service, towards prevention, management and control of diseases. Hospital mortality may reflect the care given, or may be due to the disease profile of the community. Mortality in Botshabelo District Hospital shockingly increased to half of the admissions in 2008 (54.7%). In 2008 there was an exodus of nurses in Botshabelo District Hospital. The community brought patients for care already terminally ill.

HIV/AIDS was the top cause of mortality, resulting in 21% of deaths, followed by pneumonia, cerebrovascular diseases and pulmonary TB. Other research on the matter in South Africa revealed an increase of mortality attributed to HIV/AIDS but this was not considered in this study (Corbett et al. 2003; Reid et al. 2005).

Patients with co-morbid diseases experience higher mortality rates (Rooney et al. 2008). In a rural South African population, TB and HIV mortality has been rising (Zwang et al. 2007; Conolly, Davies and Wilkinson, 1998). This indicates that there might be a need within the health system for more beds to handle the co-infected burden or drastic steps need to be taken in terms of prevention and control of both diseases.

However, the death rates may also have been due to issues in the facility. Subsequent to the strike in 2007, Botshabelo District Hospital had a high turnover of staff which could have resulted in substandard patient care. Posts could not be

filled due to the moratorium which was then implemented. This resulted in a great shortage of personnel in the hospital.

4.4.1. FACTORS ASSOCIATED WITH MORTALITY

This study showed that with increase in age, chances of mortality became greater. The research conducted in Israel, where HIV prevalence is low, showed the same increased odds of dying with age, where more elderly patients died due to coronary heart diseases, heart failure and pneumonia (Stein and Zeidman, 2006). The majority of fatalities in other studies were among the elderly i.e. above 75 years old, caused by cerebrovascular diseases (Papadopoulos et al. 2008).

During 2008 mortality was notable higher. This could be attributed to a number of factors. Firstly, patients may be seeking health care when they are terminally ill and die within a day or less of admission. At this stage the disease was so advanced that it could not respond to any medical intervention. However, one has to also wonder if health care provision has deteriorated over the years. This could be related to internal factors, e.g. health care providers not providing adequate treatment or failing to refer patients who require advanced care, or external factors such as strikes, inadequate staffing, etc.

Patients who were suffering from HIV, digestive and blood related diseases were found to have a greater chance of dying than patients with circulatory disorders. This is of concern as it appears that the ART programme is not as yet having its desired impact of reducing mortality.

Patients who resided in the H-section were found to have a lower odds of dying than patients from the A-section. This could be due to the fact that the H-section community is mostly a working and younger community whereas the A-section

community is comprised of an older and poorer community of people who came from the farms.

As discussed earlier, the study also revealed that females had a higher chance of dying than males.

4.5. LIMITATIONS

The study was confined to Botshabelo District Hospital medical adult wards only. Other admissions in the hospital were not sampled. The findings of the study may not be generalised broadly in the District or Province, as it is only confined to Botshabelo District Hospital, but can provide valuable information that can be used by the District or Province, and other researchers.

There was a sampling error for 2007 where more than 10% of the sample was selected. On collection of data some of the information was incomplete e.g. date of discharge was omitted, and in such cases, the next qualifying subject according to sampling was taken. The most affected year was 2008. Therefore, in 2008 less than 10% was sampled. It is not known if specific types of patients would have their files less completed and therefore it is not known how this may have affected the results presented.

Furthermore, the reliability of the data captured in the records may be influenced by correctness and completeness of data thus potentially reducing the quality of that data, e.g. all of the information not being recorded, such as multiple co-morbid conditions.

ICD 10 recoding was difficult and dependent on what was originally recorded as the primary diagnosis. HIV status was not always recorded as the primary diagnosis or as any other diagnosis on the records. The researcher also did not

collect information on which patients were on antiretroviral treatment if they were HIV positive and which were not. A further study on this is required.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1. CONCLUSION

HIV/AIDS and tuberculosis are the leading disease burden in this district hospital, however the chronic diseases are also notable. It is worrisome that mortality of admitted patients is increasing and this needs further investigation and monitoring.

Research such as this should be conducted in other hospitals, because we generalise that most of our medical patients are HIV/AIDS related and we might not be aware of the changing pattern of diseases like heart disease. The disease profile of the community reflects their health status, and therefore it will assist the hospital management in the planning and managing health services and resource allocation.

5.2. RECOMMENDATIONS

At the facility level, the following needs to be considered:

- The reason for the high mortality rates needs to be immediately assessed. This could be due to chronically ill patients being admitted late in their illness or due to the failure of health providers to refer patients who may survive if they receive higher levels of care. Depending on the findings, action may be taken to mobilise communities to come in early for treatment, or alternatively the standard treatment guidelines by levels of care need to be stressed.
- Record keeping was poor and this affected sampling. Health care providers should be informed that they should complete patient records and

registers as thoroughly as possible as this affects data quality and indirectly health facility planning.

- Health care providers should be encouraged to record HIV as a diagnosis as this improves the management of patients and provides a better sense of the burden of disease due to HIV.
- Treatment guidelines should be developed, with training, and fully implemented at facility level.
- Health facility issues need to be investigated and dealt with if causing problems with service delivery and quality of care. Resources like manpower, medication and consumables must be continuously available.

At the provincial level, the following should be considered:

- Despite the availability of policies like the Comprehensive HIV/AIDS and TB guidelines, the implementation of this need to be aggressive and monitoring of implementation is key.
- Policy development and the assessment of care standards can improve on the quality of services provided (Murray, Lopez, 1997). Therefore improvement on this aspect can improve on the quality of care in our hospitals.

The following research needs to be conducted:

- On the impact of the ART programme on disease admissions and mortality.

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APPENDICES

Appendix 1: Data collection tool

WARD_____

No.	Date of admission	Last three digits of hospital number	Age	Sex	Race	HIV status	Final diagnosis	Date of outcome	Outcome	If patient died , please complete
	__ / __ / 200__	---	--	M F	African White Indian Coloured	Positive Negative Unknown		__ / __ / 200__	Discharge Transfer out Death	Patient hospital number: ----- Cause of death:
	__ / __ / 200__	---	--	M F	African White Indian Coloured	Positive Negative Unknown		__ / __ / 200__	Discharge Transfer out Death	Patient hospital number: ----- Cause of death:
	__ / __ / 200__	---	--	M F	African White Indian Coloured	Positive Negative Unknown		__ / __ / 200__	Discharge Transfer out Death	Patient hospital number: ----- Cause of death:
	__ / __ / 200__	---	--	M F	African White Indian Coloured	Positive Negative Unknown		__ / __ / 200__	Discharge Transfer out Death	Patient hospital number: ----- Cause of death:

Appendix 2: Diagnosis according to the ICD 10 Code

Diseases of the circulatory system (I00-I99)	– Hypertensive diseases (I10-I15) – Pulmonary heart diseases and of pulmonary circulation (I26-I28) – Cerebrovascular diseases (I60-I69) – Other unspecified disorders of the circulatory system (I95-I99) – Congestive cardiac failure (I50)
Diseases of the blood and blood forming organs and certain disorders (D50-D89)	– Anaemia – Epistaxis
Human immunodeficiency virus diseases (HIV) (B20-B24)	
Endocrine, nutritional and metabolic diseases (E00-E90)	– Diabetes Mellitus (E10-E14) – Disorders of other endocrine glands (E20-E35) – Other disorders of glucose regulation and pancreatic secretion (E15-E16)
Diseases of the respiratory system (J00-J99)	– Upper respiratory infections (J00-J06) – Pneumonia and influenza (J09-J18) – Lower respiratory infections (J20-J22) – Diseases of the pleura (J90-J94) – Chronic respiratory diseases (J40-J47)
Diseases of the digestive system (K00-K93)	– Diseases of the peritoneum (K65-K67) – Diseases of the liver (K70-K77) – Other diseases of the digestive (K90-K93)
Diseases of the genitourinary system (N00-N99)	– Renal Failure (N17-N19)

Appendix 3: Approval letter from the Free State Department of Health



health

Department of
Health
FREE STATE PROVINCE

11 November 2009

Me Pulane Chaka
Chief Executive Officer
Botshabelo District Hospital
BOTSHABELO
9781

Dear Me Chaka

Subject: REQUEST FOR APPROVAL TO CONDUCT RESEARCH AT BOTSHABELO DISTRICT HOSPITAL

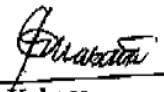
The above mentioned correspondence bears reference.

Permission is hereby granted for the above – mentioned research on the following conditions:

- Research results shared with the Department as well as all reports made available to the Free State Department of Health.
- Research does not impact negatively on service delivery.
- A presentation is done to the Clinical Health Services cluster
- Confidentiality of information will be ensured and no names will be used.

Trust you find the above in order.

Kind Regards,


Dr S. Kabane
ACT HEAD: HEALTH
Date: 12/11/09

Appendix 4: Ethics approval certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Ms Pulane A Chaka

CLEARANCE CERTIFICATE

M091153

PROJECT

Trends in Adult Wards Admissions of
Botshabelo District Hospital between 2006-2008

INVESTIGATORS

Ms Pulane A Chaka.

DEPARTMENT

School of Public Health

DATE CONSIDERED

2009/11/27

DECISION OF THE COMMITTEE*

Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE

2009/11/30

CHAIRPERSON


(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Dr R Jina

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. I agree to a completion of a yearly progress report.

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...