

PATTERNS OF ADMISSION IN ADULT MEDICAL WARDS OF A DISTRICT HOSPITAL

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A research report submitted to the Faculty of Health Sciences, University of the
Witwatersrand, in partial fulfilment of the requirements for the degree of Master of
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DECLARATION

I, Patrick Butinyana Mabuza, declare that this research report is my own work. It is being submitted for the degree of Master Public Health in the field of Hospital Management at the University of the Witwatersrand, Johannesburg. It has not been submitted before any degree or for any examination at this or any other University.



07 April 2016

DEDICATION

This research is dedicated to my friends and colleagues who were always available for me and willing to assist when there was a need.

ACKNOWLEDGEMENT

Sincere thanks are extended to all my colleagues at Matikwana Hospital for their positive contribution towards the successful accomplishment of this study. The assistance of the following deserves a special acknowledgement:

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- The Corporate Services Manager at Matikwana Hospital.
- All staff at the Patient Administration section at Matikwana Hospital
- The Head of Department, Mpumalanga Department of Health, for granting the permission to carry out the investigation.

ABSTRACT**BACKGROUND:**

The study setting was Matikwana Hospital in Mpumalanga Province in South Africa. Matikwana Hospital is a level 1 district hospital situated in Mkhuhlu Township in the Bushbuckridge municipal area at Ehlanzeni District in Mpumalanga. The hospital was facing an unprecedented increase in admissions which in turn was resulting in bed crises in the hospital. This practice led to overcrowding in the wards which, in turn, compromised the quality of healthcare as well as in respect of dignity, privacy and infection control measures.

AIM: To describe patterns of admission in the adult medical wards of Matikwana Hospital in Mpumalanga Province for a period of one year from 01 April 2010 to 31 March 2011.

RESULTS: Records of a total number of 2586 admissions, in the medical wards of Matikwana Hospital during the period from 01 April 2010 until 31 March 2011, were selected for the study through systematic sampling. The gender distribution of participants was not significantly different for both sexes (45.2% for females and 54.8% for males). The mean age of the patients admitted during the study period was 43.2 years. The median was 39 years. The ages of patients ranged from 12 to 100 years. There was a statistically significant difference in patients' age across the gender categories (p -value 0.0032). A high number of admissions (50.7%) were coming from the Hoxane Traditional Authority which is the area where the hospital is located. Most patients were admitted with Gastroenteritis (11.4%) followed by Pulmonary Tuberculosis (8.7%) and Lower Respiratory Tract Infection (7.8%). Cases of co-morbidity were also present. Other cases reflected in the top 10 leading causes of admission were Psychosis, Diabetes, Meningitis, Malaria, Anaemia, Tuberculosis and HIV. Most patients were admitted and discharged within 4 days (52.6%) whilst 7.3% stayed longer than 14 days (between 14 and 101 days).

CONCLUSION: The research identified the catchment areas where most patients are coming from and the type of diseases which are causing the most admissions in the hospital. The other critical issues identified were bed utilisation rate and the average length of stay for patients admitted during the period of study. The findings of this study will assist hospital and district management in planning for resource allocation and for appropriate distribution of healthcare services at community level.

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GLOSSARY OF TERMS

District Hospital: A district hospital provides level 1 (generalist) services to in patients and outpatients (ideally on referral from a community health centre or clinic). The hospital has between 30 and 200 beds, a 24-hour emergency service and an operating theatre. Generalists from a range of clinical disciplines provide the services. In some circumstances primary health care services are rendered where there is no alternative source of this care within a reasonable distance. (Department of Health, Republic of South Africa, 2002)

Hospital Admission: Hospital admission involves staying at a hospital for at least one night or more. (Department of Health, Republic of South Africa, 2010)

Average Length of Stay: This refers to the number of days (with an overnight stay) that a patient stays in a hospital. It is generally measured by dividing the total number of days stayed by all in-patients by the number of admissions or discharges. (OECD/WHO (2012))

Bed Utilisation Rate: A measure of utilisation of the available bed capacity. It indicates the percentage of beds occupied by patients in a defined period, usually a year (World Health Organization 2011)

LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
DHIS	District Health Information System
DHS	District Health System
GP	General Practitioner
HOD	Head of the Department
BOT	Build Operate and Transfer
PPD	Per patient per day

PAAB	Patient Administration and Billing System
NZ	New Zealand
PHC	Primary Health Care
LOS	Length of Stay
ALOS	Average Length of Stay
BUR	Bed Utilisation Rate
IQR	Interquartile Range

CHAPTER 1

INTRODUCTION

The purpose of this study was to describe patterns of admission in the adult medical wards of Matikwana District Hospital in Mpumalanga Province. This introductory chapter will cover the background to the study, statement of the problem, its aims and objectives and an outline of subsequent chapters.

1.1 INTRODUCTION

The study setting was Matikwana Hospital in Mpumalanga Province in South Africa. Matikwana Hospital is a level 1 district hospital situated at Mkhuhlu Township in the Bushbuckridge municipal area at Ehlanzeni District in Mpumalanga Province.

The hospital is run under a PPP (Public Private Partnership) agreement. The nature of the agreement is a BOT (Build, Operate and Transfer). In other words the hospital was built by a private company, presently called Life Esidimeni, on an agreement that the company will provide healthcare services to the public and be paid by the Mpumalanga provincial health department for the duration of the contract, after which the company would transfer ownership of the hospital and its assets over to the Department. The current contract covers a period of 25 years from commencement in 1989.

The hospital was facing an unprecedented increase in admissions which in turn was resulting in a bed crisis. Between April 2003 and March 2004 there was an overall 11687 in-patient days as compared to a subsequent massive increase to 22803 in-patient days during the period from April 2009 to March 2010. A general concern was that more patients were being admitted to the hospital in excess of the approved bed numbers resulting in overcrowding of wards. Furthermore, hospital resources were getting overstretched. The overall bed utilisation rate

(BUR) from April 2010 to March 2011 was 93% whilst the BUR for the preceding years was 87% and lower (District Health Information System, 2010/11)

The prevailing national benchmark target for BUR for district hospitals in South Africa during the period of study, from 01 April 2010 to 31 March 2011, was 75% (District Health Barometer 2010/11, 2012)

No research has been conducted to determine the causes of the increase in medical admissions in the hospital. It is therefore necessary to investigate the patterns of admission in the adult medical wards of the hospital.

1.2 STATEMENT OF THE PROBLEM

A general concern was that more patients were being admitted in the hospital in excess of the approved bed numbers resulting in overcrowding of wards and, furthermore, hospital resources were constantly getting overstretched.

1.3 JUSTIFICATION FOR THE STUDY

Admissions in the hospital had constantly increased to high levels in recent years, sparking off concerns about the quality of care to be offered in those circumstances. Due to the increase in admissions, extra beds had to be pushed in into available spaces in the wards in order to provide for more admissions in excess of the approved bed numbers. This led to overcrowding in the wards. Overcrowding of wards poses various challenges. Some of the challenges include low staff morale due to staff being overworked. Further concerns were for the possible decline in the quality of service rendered due to inadequate infection control, and also patient issues of privacy and dignity which are severely compromised during overcrowding. The reason for the increase in admissions was unknown. To understand the problem better there is a need to analyse the patterns of admission in both the male and female medical wards in the hospital.

1.4 RESEARCH QUESTION

What are the patterns of admission in adult medical wards of a district hospital?

1.5 STUDY OBJECTIVES

1.5.1 BROAD OBJECTIVE

The aim of the study is to describe the patterns of admission in the adult medical wards of Matikwana Hospital for the period from 01 April 2010 to 31 March 2011.

1.5.2 SPECIFIC OBJECTIVES

- 1.5.2.1 To determine the number of patients admitted in the adult medical wards of Matikwana Hospital during the period from 01 April 2010 to 31 March 2011.
- 1.5.2.2 To describe the socio-demographic profiles (age, sex, marital status, employment) of these patients.
- 1.5.2.3 To identify the Clinical profiles (Diagnosis and referral status) of these patients.
- 1.5.2.4 To identify the clinical outcomes (discharged, died, transferred and length of stay) of these patients.
- 1.5.2.5 To determine a relationship between the socio-demographic factors and outcomes (by length of stay, discharged, died) for these patients.
- 1.5.2.6 To identify the catchment areas of the patients admitted in the hospital.

1.6 SUBSEQUENT CHAPTERS

So far, the background to the research has been discussed. The research question and objectives were defined in this first chapter. A brief outline of following chapters is described below.

Chapter Two: Literature Review: The purpose of the literature review is to review pertinent literature and to discuss concepts related to the patterns of admission in adult medical wards of hospitals in South Africa and elsewhere.

Chapter Three: Research Methodology: The chapter describes the research methodology, study design, setting and scope and data management techniques used in this study.

Chapter Four: Presentation of Results: This chapter deals with an analysis of the data collected for this study relating to its aims and objectives.

Chapter Five: Discussion: The findings from the review of the literature are incorporated in this chapter with the results obtained from the analysis in order to address the aims and objectives of the study.

Chapter Six: Conclusions and Recommendations: This constitutes the last chapter of the report and derives conclusions from the research related to the objectives of this study, makes recommendations and advocates areas for future research in the field of admission patterns in adult medical wards of a district hospital.

CHAPTER 2

LITERATURE REVIEW

In this chapter, relevant literature on patterns of admission in adult medical wards with particular reference to public hospitals is discussed. In addition to published literature, information from various unpublished sources is also reviewed.

2.1 INTRODUCTION

Literature reviewed demonstrates that admission trends have been widely researched in many countries in the world within various settings. Various studies confirm that in many countries medical admissions have continued to increase well above the expected rates despite taking the demographic considerations into account. In the literature, a number of causes for the increase in medical admissions have been identified and explored. Some of the significant causes of increased admissions are discussed in the following sections under the subheadings of; patient and disease profiles in hospitals, socio-economic history of patients, socio-demographic profiles of patients, trends in medical admissions, appropriate bed use and length of stay.

2.2 PATIENT AND DISEASE PROFILES IN HOSPITALS

In the study of disease patterns in the medical wards of a rural South African hospital, Ndjeka and Ogubango (2003) explained that epidemiological information on disease profiles of the black population in Southern Africa was minimal. Also explained in Ndjeka and Ogubango (2003) is a similar study conducted by Edginton, Hodgkinson and Seftel (1972). Between September 1968 and January 1970, Edginton et al. reviewed the diagnoses of 485 female and 53 male patients admitted in the medical wards of Jane Furse Memorial Hospital in Sekhukhuneland. The aim of their (Edginton et al., 1972) study was to document similarities and differences in disease patterns among black people living in

Sekhukhuneland (rural) and Johannesburg (urban). The study found that pulmonary tuberculosis dominated the disease pattern, followed by rheumatic heart disease, cardiomyopathy, onyalai, goitre and, unexpected to the study, diabetes mellitus. The study further found that severe obesity, hypertension, bronchial asthma, cholelithiasis, peptic ulceration, and porphyria cutanea tarda were rarely diagnosed. Other authors cited in Ndjeka and Ogunbanjo (2003) are Falkner and Reev (1986) who conducted a similar study on 997 patients admitted in the same hospital (Jane Furse Memorial Hospital, South Africa) between 01 November 1982 and 31 October 1983. Their results revealed increasing incidences of asthma, hypertension and diabetes well prominent in urban blacks, while tuberculosis remained a common problem and a cause for concern. (Ndjeka & Ogubanjo, 2003)

Other studies done internationally found that most of the patients admitted in medical wards were older and living with chronic diseases with most of them being in a combination of medications. For example, the PA Consulting Group (PA) and Balance of Care Group (BOC) (2007) found that in the Republic of Ireland 62% of patients were sixty-five years or above and, over and above that, 52% were on multiple medications. The study observed that a high number of the patients had one or more co-morbidities during admission. The main illnesses identified in the study were hypertension, ischaemic heart disease and chronic obstructive pulmonary disease. (PA Consulting Group and Balance of Care, 2007)

A study conducted in Sudan, to investigate characteristics of patients admitted to medical wards of a referral hospital in a developing country, found that infections accounted for most admissions which included gastroenteritis, pneumonia, malaria, enteric fever, tuberculosis and diabetes. (El Bingawi, Hussein & Bakheet, 2014)

2.3 SOCIO-ECONOMIC HISTORY OF PATIENTS

Accorsi et al. (2001) highlighted that in African countries with high mortality, there was an array of combinations of diseases in relation to the association of disease and poverty. The highest mortality ratio among the poor was reported for cases relating to pregnancies and for infectious or parasitic diseases. Also cited in Accorsi, et al. (2005) is Graham (2001). According to Graham (2001), in the places of Sub-Saharan Africa, the inequalities in healthcare had been compounded by wars and disease outbreaks, together with the increasing difficulties of making choices among competing demands. Graham (2001) suggested that in order to reduce the existing inequalities in healthcare, more resources would need to be mobilised, distributed equitably and used efficiently. (Accorsi et al., 2005)

In the study of socioeconomic-related health inequality in South Africa: evidence from General Household Surveys, John E Ataguba, James Akazili and Di McIntyre (2011) highlighted that international studies have found that there is a relationship between low levels of socioeconomic status with a higher burden of a combination of illnesses. Ataguba et al. further indicated that the negative association observed in their study demonstrated that the burden of diseases and disability was higher among the people with a low socioeconomic status in South Africa. The authors pointed out that even though non-communicable diseases are commonly regarded as diseases of the rich, these diseases were also reported among the poor population. The authors therefore suggested that it would be imperative for governments to address the underlying social determinants of ill-health, which would include focussing government efforts to solve the socioeconomic elements that pre-exposes the vulnerable population, which is already carrying the highest burden of diseases, to the risks of illnesses and subsequently becoming disabled. (Ataguba et al., 2011)

2.4 SOCIO-DEMOGRAPHIC PROFILES OF PATIENTS

Few studies are available to assess the association between socio-demographic factors and admission.

A study conducted at Jimma University Specialized Hospital, Southwest Ethiopia, observed that among the leading causes for admission in hospital more males were admitted than females, except in instances of infectious and parasitic diseases. The study noted that there was a definite relationship between sex of patients and the causes of admission. However, the study could not find any significant association between causes of admission and places of residence. (Ali and Woldie 2010)

The study of Analysis of Trends and Reasons for Rising Acute Adult Medical Admissions in Auckland's Public Hospitals, Benipal (2007) found that the number of admissions and age-standardised admission rates at two hospitals (Middlemore and Auckland Public Hospitals in New Zealand) increased rapidly than the actual population increases. The study also observed that approximately one third of the patients accounted for two thirds of the overall admissions. Five of the leading diagnoses contributed seventy to eighty percent of all the admissions, with circulatory and respiratory system disorders being the leading causes of admissions. The study further found that there evidence of a strong association between patients' ages and the increase in admissions. In the same study, Benipal noted that an analysis of ethnic groups showed significant variations in admission rates within the two hospitals irrespective the adjusting for age, morbidity and deprivation. (Benipal, 2007)

The New Zealand Health of Older People strategy highlighted that the New Zealand (NZ) population, with only 11.5% of people 65 years and over, may be considered much younger than those of other developed countries. However, (as supported in Benipal, 2007) the Ministry of Health (2002d) projected the

proportion of older people was to grow to 22% by 2031, and there is already a growing demand for healthcare services by the older age groups. In the same study, a discussion document on the Ageing NZ and Health and Disability Services by NZIER (2004) was also cited. The document confirmed that the number of people at the age of above 65 years old would grow by 72% during 2001-2021. The projected increase in the proportions of 65+ year Maori, Pacific Islander and Asian groups was even greater for the same period. As a result, the costs associated with health and disability services were expected to increase rapidly with ageing, which is likely to create further funding challenges. (Benipal, 2007)

2.5 TRENDS IN MEDICAL ADMISSIONS

In their study of admission trends in a rural South African Hospital during the early years of the HIV epidemic, Floyd, Gilks, Reid and Wilkinson (1999) found that there was an increase of eighty-one percent, from 6562 patients in 1991 to 11,872 in 1998 for the period between the year 1991 and 1998 at a 450-bedded hospital at the Hlabisa District in South Africa. The study showed that admissions caused by tuberculosis increased greatly by 360%, from 303 to 1393 patients. According to the study, in 1998, medical ward admissions caused by tuberculosis consisted of 47% adult males and 30% of female patients and this amounted to 11% of the total admissions. The study further found that non-tuberculosis clinical HIV & AIDS admissions increased forty-three fold, which led to a 4% of adult medical admissions in 1997 as compared to 0.2% in 1991. Other findings of the study are that tuberculosis and non-tuberculosis clinical HIV & AIDS diseases were the only illnesses to show a trend which was consistently upward for the period of the study whereas the trends in other types of admissions differed more and there were no significant changes.

Other studies have made similar findings. Tuberculosis and communicable diseases showed to be the most common reasons for admission. For example,

Ali and Woldie (2010), found that communicable diseases were still the most common reasons for medical admissions at Jimma University Specialized Hospital in Southwest Ethiopia and that the outcome of medical admissions had not changed over a number of years. Whilst Dedicoat, Gilks, Lalloo and Reid (2005) on the other hand confirmed that after 1991, tuberculosis was the common reason for admission, they indicated that in 2002 the disease became the highest cause of death at Hlabisa District Hospital in Northern KwaZulu/Natal, in South Africa. Their study further demonstrated that HIV & AIDS had contributed to the high cases of medical admissions. According to the study, the high number of admissions was caused mainly by infectious diseases including TB, lower respiratory infection, and diarrheal problems.

In the review of admission to hospital among adults in Africa, Anthony O. Etyang and John Anthony Gerard Scott (2012) made similar findings. Their review provided information to show that cardiovascular diseases was responsible for a distinct and rising proportion of the reasons for admission among adults in sub-Saharan Africa. Infectious and parasitic diseases, including malaria, bacterial diseases, and HIV disease, were the highest diagnosis for the areas and period which was reviewed. The authors also found that disorder of the digestive system, genitourinary system and circulatory system were common. However, the categories of diseases among all the admissions under review varied with the time within the decades which were reviewed.

2.6 APPROPRIATE BED USE

According to the District Health Barometer 2010/11 (2012), the national average BUR was 64.8% for all district hospitals in South Africa during the period covered by this study. The report indicates that the national average bed utilisation rate was below the prevailing national target of 75%. The BUR ranged from 82.7% for the City of Cape Town to 46.2% for Frances Baard in the Northern Cape, with a

1.8-fold difference. All six Western Cape districts had a BUR which was higher than the national target. (District Health Barometer 2010/11, 2012)

In the study of technical efficiency of district hospitals: Evidence from Namibia using Data Envelopment Analysis, Eyob Zere et al. (2006) highlighted that the mean bed utilisation (occupancy) rates for district hospitals for the period under their study were much lesser than the generally accepted bed occupancy levels of between eighty to eighty-five percent. Furthermore, they observed that some of the hospitals had BUR's which were too low, even when they were compared with the means of the hospitals included in their study.

According to Eyob et al. (2006), in most countries of the sub-Saharan Africa, there is a constant pressure to provide more healthcare services which is caused by the emergence of new illnesses problems which occur with time. The study also identified that the resources, which are required to respond appropriately to the healthcare problems, were declining gradually to the point that this was affecting the existing efforts towards achieving the health-related Millennium Development Goals.

Similar studies confirm that hospitals throughout the world are facing challenges of balancing quality of healthcare services against minimising costs of care. According to Anderson, Attwood and Brodhurst, Gatherer, Meara and Timbrell (1988), in the United States medical aid companies are influencing cost reduction in hospitals. According to the authors, the medical aid companies determine the appropriate conditions for admission as well as the acceptable length of stays through their processes of payment. In the United Kingdom, on the one hand, admissions to hospital are being influenced by general practitioners. The length of stay (LOS) is mostly used to determine how many patients are waiting for a bed. (Anderson et al., 1988)

In the study of trends in hospital bed utilisation in New Zealand, Malcolm (2007) confirms that hospital beds are a very important but expensive resource for every health system. The study states that attempts to minimise costs for providing healthcare for the past two to three decades focused mainly on reducing bed numbers and the bed utilisation by reducing the ALOS, introducing processes to monitor admissions, and opting for approaches of rendering community-based healthcare services. The study concludes by noting that subsequent to this intervention, all health systems reported a reduction in bed numbers and bed utilisation.

2.7 LENGTH OF STAY (LOS)

The length of stay refers to the number of days (with an overnight stay) that patients spend as inpatient at hospital. The average length of stay (ALOS) is generally measured by dividing the total number of days stayed by all patients in acute care inpatient institutions by the number of admissions or discharges. (OECD/WHO (2012))

A study on resource utilization and admission trends in medical wards in a district hospital in South Africa found that the length of stay in the medical wards was not normally distributed, there was no significant difference in length of stay between female (5 days) and male patients (4 days). The study further found that the shortest period spent in the adult medical wards was one day and the longest periods were 429 days for females and 114 days for males. (Mautjana, 2011)

Similar challenges of hospital stay were identified in the study of characteristics of patients admitted to medical wards of a referral hospital in a developing country, conducted in Sudan. According to the study 277 (63.2%) patients stayed for less than 5 days while 161 (36.8%) stayed for more than 5 days. (El Bingawi, Hussein & Bakheet, 2014)

The OECD/WHO (2012), in the Asia/Pacific region, found that there were great differences in patient length of stay (LOS) for acute hospital care. The study, though, found that the differences were not that high when compared with the overall availability of beds. The study found that the longest ALOS were in Japan, the Republic of Korea and China, which was above eight days and the study also observed that this ALOS was much longer than the ALOS in Sri Lanka, Bangladesh and Thailand. The shortest ALOS was found in Sri Lanka, at three days. A further observation was that this result, together with a higher level of admission rates in that country suggested that inpatient services, in that country, are probably being used in the expense of OPD services, with patients getting admitted for less serious health problems, cases that are normally treated in OPD in many countries. Therefore, the authors concluded that the average length of stay for the Asian countries and economies was lesser than the ALOS of countries falling under the Organisation for Economic and Cooperation Development. The results were 6.4 in Asian countries against 7.2 days in the developing countries. (OECD/WHO, 2012)

In the review of acute hospital bed use in hospitals in the Republic of Ireland, the PA Consulting Group (PA) and Balance of Care Group (BOC) (2007) found that 13% of hospital admissions and 39% of patient days were regarded as being inappropriate in accordance with the Appropriateness Evaluation Protocol (AEP) criteria. The authors noted that whilst these percentages were generally high and unsustainable, they however matched the results of similar studies conducted in Ireland and other countries with similar health problems. The review emphasized the necessity to address the hospitals' internal elements that affect the length of stay, bed occupancy and bed utilisation. The study recommended that focus should be placed on strengthening the systems for planning and managing discharges, thus reviewing and assessing patient regularly in order to ensure effective utilisation of available beds.

According to the District Health Barometer 2010/11 (2012), Health Systems Trust in South Africa, the average length of stay (ALOS) is a process indicator which measures issues of quality and the efficiency of hospitals. If the ALOS is persistently high, the indication is that patients may be spending many days than necessary in hospital. This could mainly be because the patients are not discharged on time or the treatment is not appropriate. This ultimately affects the timely recovery of the patients or it prolongs their stay in hospital when they were supposed to have been discharged. The report recommends that procedures for admitting, treating and discharging the patients should be reviewed accordingly. Another reason for the long ALOS could be because patients are kept in hospital after discharge. In case the average length of stay becomes consistently low at about one and a half day or less, it may suggest that the quality of service is poor in that patients get discharged earlier than they should be, or the referral to other hospitals is high. If the low ALOS occurs in conjunction with a high bed utilisation rate (>90%), the suggestion is that the hospital is very busy, with a high turnover of patients. It could imply that patients who are very ill and those with complications are being referred to other hospitals. (District Health Barometer 2010/11, 2012)

CHAPTER 3

METHODOLOGY

The methodology for this study was selected on the basis of its aims and objectives. In this chapter the following are discussed: setting, scope, and study design and research tools.

3.1 STUDY DESIGN

The study design was a descriptive, cross sectional, retrospective record review.

3.2 STUDY SETTING

The study setting was the adult medical wards of Matikwana Hospital. Matikwana Hospital is situated at Mkhuhlu Township, in the Bushbuckridge municipal area, in Mpumalanga Province. Bushbuckridge is one of five subdistricts falling under Ehlanzeni District. The other four subdistricts are namely; Nkomazi, Umjindi, Mbombela and Thaba Chweu.

Please see the map of Ehlanzeni District below.

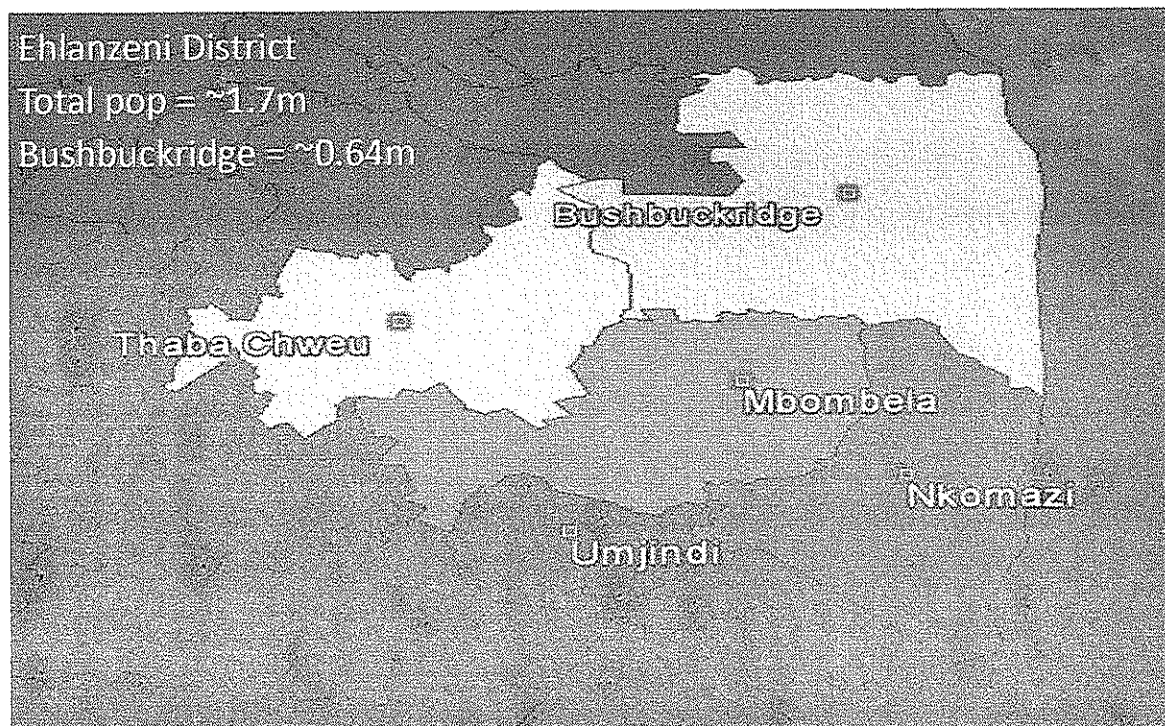


Figure 1: Map of Ehlanzeni District

3.3 STUDY SCOPE

The study involved a retrospective record review of all patients admitted in the hospital from April 2010 to March 2011.

3.4 STUDY PERIOD

The study period was one year (April 2010 – March 2011).

3.5 STUDY POPULATION AND SAMPLING

The study population included all records of patients admitted in the medical wards of Matikwana Hospital from 01 April 2010 to 30 March 2011. There was no sampling of files thus; all patients' records were selected for the purpose of having enough sample. 2586 patients were admitted during the study period.

3.6 DATA MANAGEMENT

3.6.1 STUDY INSTRUMENT

The data relevant to this study are routinely collected for the District Health Information System (DHIS) using a PAAB system which is a patient administration and billing system used by the department of health. Additional data is available from admission registers. Where data is missing on PAAB and admission registers, patient files were used to collect the missing data. A data collection tool was used to collect data from the PAAB and admission registers. The data collection tool reflects the required information appearing on patients' records. (Appendix B)

3.6.2 VARIABLES

The following variables were measured during the study;

Objectives	Variables of the study
Objective 1 To determine the number of patients admitted in the adult medical wards of Matikwana Hospital during the period from 01 April 2010 to 31 March 2011.	• Number of patients admitted
Objective 2 To describe the socio-demographic profiles (age, sex, marital status, employment) of these patients	• Gender • Age • Marital status • Educational Status • Employment status • Area of residence
Objective 3 To identify the clinical profiles of these patients	• Diagnosis

Objective 4 To identify the clinical outcomes (discharged, deceased, transferred) of these patients	• Separations (Discharged/Transferred/Deceased/Transferred)
Objective 5 To determine a relationship between the socio-demographic factors and outcomes of these patients	• Diagnosis • Separation status • Date of admission • Date of separation (Discharged/Transferred/Deceased/Transferred) • Length of stay
Objective 6 To identify the catchment areas of the patients admitted in the hospital	• Patients' places of residence per villages • Patients' places of residence per traditional authorities

3.6.3 DATA COLLECTION

A MS Excel based data-collection was designed for this study (Appendix B). This tool was used to extract data from the PAAB system, admission registers and patient files.

3.6.4 DATA ANALYSIS

All data was captured in MS excel software. Subsequently, data was exported to EPI Info and Stata 10 software for analysis.

The following descriptive statistics were reported:

- Continuous variables (normally distributed): mean and standard deviation;
- Continuous variables (not normally distributed): median and inter-quartile range, and
- Nominal and ordinal variables: proportions.

A comparative analysis was done using following statistical tests:

- Continuous variables with normal distribution: t-test
- Other continuous variables: Mann-Whitney's U test
- Nominal and ordinal variables: Chi-square test

The statistical significance was calculated at the 95% confidence level.

3.7 PILOT STUDY

No pilot study was done as the data used for this study were routinely collected.

3.8 ETHICAL CONSIDERATIONS

No intervention was done as a part of this study. The permission to conduct this study was obtained from the Mpumalanga Department of Health (Appendix A). The project was also approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (Appendix A). Confidentiality and anonymity was maintained at all times in the process of collection, capturing, and reporting of the information.

CHAPTER 4

RESULTS

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

4.1 STUDY POPULATION

A total number of 2586 admissions, in the medical wards of Matikwana Hospital during the period from 01 April 2010 until 31 March 2011. All patients were selected for the study period.(Table 4.1)

More males were admitted than females during the period of the study. The gender distribution of participants was not significantly different for both sexes (45.2% for females and 54.8% for males). (Table 4.1 below)

Table 4.1: Study Population

Gender	Frequency	Percent
Female	1170	45.2%
Male	1416	54.8%
Total	2586	100.0%

4.2 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

4.2.1 AGE OF PATIENTS BY GENDER

The mean age of the patients admitted during the study period was 43.2 years. The median was 39 years. The ages of patients ranged from 12 to 100 years. There was a statistically significant difference in patients' age across the gender categories. (p-value 0.0032) (Table 4.2)

Table 4.2: Age of patients by gender

Age (in years)	Total (n = 2586)	Male (n= 1416)	Female (n = 1170)
Mean $\pm$ SD	43.1 $\pm$ 18.4	44.0 $\pm$ 18.2	42.3 $\pm$ 18.6
Minimum	12	12	13
Maximum	100	97	100

* Mann-Whitney test done

4.2.2 AGE OF PATIENTS IN CATEGORIES

More patients in the age groups of 20 – 35 years old (35.2%) and 36 – 60 years old (39.6%) were admitted during the period of study and fewer patients under the age of 20 years were admitted (5.5%).

Table 4.3: Age in categories

Age group	Frequency	Percent
Under 20 years old	142	5.5%
20 - 35 years old	911	35.2%
36 - 60 years old	1024	39.6%
Above 60 years old	509	19.7%
Total	2586	100.0%

4.2.3 MARITAL STATUS

The marital status of patients indicates that the majority of patients admitted were single. There were more single female patients than male patients. (Chi-square test, $p < 0.001$)

Table 4.4 Marital status

	Total	Male	Female
Single	2032 (79%)	1045 (74%)	989 (85%)
Married	483 (19%)	333 (23%)	149 (12.5%)
Divorced	27 (1%)	23 (2%)	4 (0.5%)
Widowed	43 (2%)	16 (1%)	28 (2%)
Total	2586 (100%)	1416 (100%)	1170 (100%)

4.2.4 EDUCATION STATUS

The education status indicates the majority of patients had high school education (49%). More females (52%) had high school education than males (47%).

Table 4.5 Education status

	Total	Male	Female
No education	606 (23%)	343 (24%)	262 (22%)
Primary	585 (23%)	331 (23%)	254 (22%)
High school	1274 (49%)	663 (47%)	612 (52%)
Tertiary	122 (5%)	122 (6%)	42 (4%)
Total	2586 (100%)	1416 (100%)	1170 (100%)

4.2.5 EMPLOYMENT STATUS

The employment status indicates that the majority of the patients (82%) were unemployed. There were more unemployed male patients than female patients. The majority of patients are poor as pointed out in Table 4.6 below.
(Chi-square test, $p < 0.001$)

Table 4.6 Employment status

	Total	Male	Female
Employed	153 (6%)	119 (8%)	33 (3%)
Pensioner	307 (12%)	170 (12%)	136 (12%)
Unemployed	2126 (82%)	1127 (80%)	1000 (85%)
Total	2586 (100%)	1416 (100%)	1170 (100%)

4.2.6 PATIENTS' PLACES OF RESIDENCE

4.2.6.1 Patients' Residences per Traditional Authority Demarcations

A high number of admissions (50.7%) were coming from the Hoxani Traditional Authority area, which is the area where the hospital is located. The other Traditional Authorities within the catchment area of the hospital recorded much lower admissions; Jongilanga (10.7%) and Mathibela (15.1%), together they form 25.8% of the total admissions. Areas lying outside the catchment of the hospital (Mbombela, Bushbuckridge, Thaba Chweu and other districts) contributed 17.6% of the admissions (Table 4.6).

Table 4.7 Area of Residence per sub-district or Traditional Authority

Residential Catchment Area	Frequency	Percent
Hoxani Traditional Authority	1311	50.7%
Jongilanga Traditional Authority	276	10.7%
Mathibela Traditional Authority	390	15.1%
Mbombela Sub-district	343	13.3%
Bushbuckridge North	104	4.0%
Missing Record	156	6.0%
Other Districts	2	0.1%
Thaba Chweu	4	0.2%
Total	2586	100.0%

4.2.6.2 VILLAGES CONTRIBUTING TO A HIGH NUMBER OF ADMISSIONS

Most patients were coming from the Mkhuhlu area (31.9%) which comprises of the Mkhuhlu Township where the hospital is situated and Mkhuhlu village together with other surrounding settlements. There is no significant difference among the other places of residence such as Calcutta (3.8%) Belfast (3.3%) Cork (3.8%) Oakley (4.0%) Marite (6.0) Shabalala (2.8%)

Table 4.8 Villages contributing to a high number of admissions

RESIDENTIAL ADDRESS	FREQUENCY	PERCENT
Belfast	86	3.3%
Calcutta	144	5.6%
Cork	99	3.8%
Marite	157	6.1%
Mkhuhlu	825	31.9%
Oakley	103	4.0%
Shabalala	73	2.8%
Soweto	51	2.0%

4.3 CLINICAL PROFILE OF PATIENTS

4.3.1 Top Ten Causes of Admission

Most patients were admitted with Gastroenteritis (11.4%) followed by Pulmonary Tuberculosis (8.7%) and Lower Respiratory Tract Infection (7.8%) followed by psychosis (6.6%). The remaining leading causes of admission included Diabetes (5.4%), Meningitis (4.2%), Malaria (3.3%), Anaemia (3.1%) and HIV (2.4%). The results show evidence of presence of co-morbidity. (Table 4.9)

Table 4.9 Top ten causes of admission

Diagnosis	Frequency	Percent
Gastroenteritis	293	11.4%
Pulmonary Tuberculosis	223	8.7%
Lower Respiratory Tract Infection	200	7.8%
Psychosis	171	6.6%
Diabetes	138	5.4%
Meningitis	107	4.2%
Malaria	86	3.3%
Anaemia	79	3.1%
Tuberculosis	78	3.0%
HIV & AIDS	61	2.4%

4.4 SEASONALITY OF ADMISSION

In comparison of morbidity during the four seasons, more patients were admitted in spring and winter than in summer and autumn. (Table 4.10).

Table 4.10 Seasonality of admission

Season	Total	M	F
Spring (Sept – Nov)	828 (32%)	368 (26%)	460 (39%)
Summer (Dec – Feb)	483 (19%)	386 (27%)	97 (8%)
Autumn (March – April)	481 (19%)	319 (23%)	162 (14%)
Winter (May – June)	794 (31%)	343 (24%)	451 (39%)
Total	2586 (100%)	1416 (100%)	1170 (100%)

4.5 LENGTH OF STAY (LOS)

The mean LOS of the patients was 5.9 days. The median was 2. The range was between 0-106 days. There was no significant difference between male and female patients. (Mann Whitney's U test, $p = 0.16$) (Table 4.11)

Table 4.11 Length of Stay of Patients

Age (in years)	Total (n = 2586)	Male (n= 1416)	Female (n = 1170)
Median	2	4	4
IQR	2-8	2-8	2-8
Minimum	1	1	1
Maximum	106	106	74

4.6 LENGTH OF STAY IN CATEGORIES

Most patients were admitted and discharged within 4 days (52.6%) whilst 7.3% stayed longer than 14 days (between 14 and 101 days).

Table 4.12 Length of Stay of Patients

Category Length of Stay	Frequency	Percent
Stayed for four days or less (District Norm)	1359	52.6%
Stayed for seven days	558	21.6%
Stayed for fourteen days	480	18.6%
Stayed longer than 14 days	189	7.3%
Total	2586	100.0%

4.7 CLINICAL OUTCOMES

There was a high rate of mortality among the patients (23%). There was no difference in mortality between male and female patients (Mann Whitney's U test, $p = 0.16$). Significantly more female patients went home than male patients (Chi-square test, $p < 0.01$). This could be because more males were transferred out to other hospitals (4%) and others refused treatment (0.5%). (Table 4.13)

Table 4.13 Clinical outcome

Separation	Total	M	F
Home	1845 (71%)	975 (69%)	870 (74%)
Transfer	86 (3%)	61 (4%)	25 (2%)
Absconded	6 (0.5%)	6 (0.5%)	0
refused hospital treatment	50 (1.5%)	25 (1.5%)	25 (2%)
Deceased	599 (23%)	349 (21%)	250 (21%)
Total	2586 (100%)	1416 (100%)	1170 (100%)

CHAPTER 5

DISCUSSION

In this chapter, the results obtained from the analysis of the data are discussed and compared with those from other published studies.

5.1 INTRODUCTION

The study was done in order to assess patterns of admission in the adult medical wards of Matikwana District Hospital in Mpumalanga Province for the period from 01 April 2010 to 31 March 2011. No study had been conducted at the level of a district hospital in Mpumalanga Province to look at the patterns of admission in adult medical wards of a district hospital.

5.2 CASE RETRIEVAL

Findings of this report were derived from a record review of admissions done at Matikwana District Hospital during the period from 01 April 2010 to 31 March 2011. 2586 patients were selected from the Patient Administration Billing System (PAAB), as well as admission and discharge registers.

The overall bed utilisation rate (BUR) from April 2010 to March 2011 was 93% whilst the BUR for the preceding years was 87% and lower. (District Health Information System, 2010/11)

5.3 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

A total number of 2586 admissions were recorded during the period of study. More males were admitted than females. The gender distribution of participants was not significantly different for both sexes (45.2% for females and 54.8% for males). This shows that the workload in the medical wards of the hospital is of

equal proportion. This finding is in contrast with the study which observed that in the top three major reasons for admission males out-numbered females except in the infectious and parasitic diseases category.

The results of the study shows that a large number of patients admitted (23%) reside outside the catchment area of the hospital. This therefore poses a challenge in determining the actual catchment population size of the hospital because patients coming from outside the catchment area are not accounted for in the approved population size of the hospital. This, in turn, may inadvertently lead to an under estimation of the approved bed capacity further resulting in underfunding or allocation of insufficient resources to the hospital.

5.4 SOCIO-ECONOMIC STATUS OF PATIENTS

The majority of the patients in this study came from a poor socio-economic class. Among all the patients admitted 82% of them were unemployed whilst 12% were pensioners. Only 6% were employed. Therefore, this confirms that the patients are mainly dependent on public health facilities for their health care and may not afford to pay for alternative or private health care services. This finding is in line with observations made in similar studies in Africa.

5.5 BED UTILISATION AND LENGTH OF STAY

A very high bed utilisation rate (BUR) suggests that the hospital is very busy and that the quality of care provided to patients may be compromised due to insufficient staff to provide optimal care to patients. A very low BUR may suggest that the hospital is under-utilised either because there is no need for the service in the area, or because patients choose not to use the hospital. If persistently low, the hospital or wards may require closure. It may also point to poor data collection practices or recording of usable beds. BUR should be read in conjunction with the average length of stay (ALOS).

Although most patients were discharged within four days of admission (52%), the study identified that there was a significantly high number of patients who stayed longer than four days, others staying for longer than hundred days. This is an indication of possible challenges in the system such as shortage of staff, inadequate ward rounds by doctors or lack of effective monitoring mechanism to identify inefficiencies in bed utilisation. A high ALOS has a direct impact on a high bed utilisation rate which in turn increases the cost of providing care to the patients.

This findings compare with findings of similar studies in South Africa and internationally. In the study on resource utilization and admission trends in medical wards in a District Hospital in South Africa (2011), Mautjana N.M. found that the length of stay of patients admitted in adult medical wards at the George Masebe Hospital during a six month period in 2009 varied from one day to more than a year. One of the factors identified by Mautjana was lack of sufficient administration staff to discharge patients from the hospital information system. (Mautjana, 2011)

5.6 CLINICAL PROFILE OF PATIENTS

5.6.1 CAUSES OF ADMISSION

Most patients were admitted with Gastroenteritis (11.4%), an indication that patients may be having challenges of access to clean water at their areas of residence, followed by Pulmonary Tuberculosis (8.7%) and Lower Respiratory Tract Infection (7.8%). Cases of co-morbidity were also present. The top ten diseases leading to admission also included Psychosis, Diabetes, Meningitis, Anaemia, Tuberculosis, HIV & AIDS and Malaria. The presence of most of these diseases could be a reflection of the impact of HIV and AIDS which has not been investigated in this study.

Increase in admissions may be influenced by various factors which include the growth in size of the population served by the hospital, the burden of disease and the level of care at clinic and community level.

The findings of this study compare with findings of other studies in Africa and in South Africa. In a study of a rural hospital in the Limpopo Province, it was found that hypertension (19%), followed by pulmonary tuberculosis (10%), accounted for most admissions (Ndjeka and Ogubanjo, 2003).

In the study on reasons and outcomes of admissions to the medical wards of Jimma University Specialized Hospital, Southwest Ethiopia, Ali et al. (2010) found that causes of admission to the medical wards of Jimma were diseases of the respiratory system, followed by infectious and parasitic diseases, diseases of the nervous system, and diseases of the circulatory system. In the category of the respiratory system diseases in the major subcategory were community acquired pneumonia, followed by pneumocystic carinii pneumonia and chronic lower respiratory diseases.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the results obtained from this study were assessed in relation to the aims and objectives of the study, so that appropriate conclusions can be drawn. The limitations of the study are also listed. Based on the findings of the study, appropriate recommendations and suggestions for future research are included.

6.1 CONCLUSIONS

The overall aim of the study was to reflect the patterns of admission in the adult medical wards of Matikwana Hospital.

The research identified the areas where most patients are coming from and the type of diseases, such as Gastroenteritis, Pulmonary Tuberculosis, Lower Respiratory Tract Infection, Psychosis, Diabetes, Meningitis, Anaemia, Tuberculosis, HIV & AIDS and Malaria, which are causing the most admissions in the hospital.

The influx caused by patients residing outside the catchment of the hospital such as Mbombela (13.3%), Bushbuckridge North (4.0%) and Thaba Chweu (0.2%) was also identified. Patients coming from areas outside the catchment of the hospital are likely to cause an unnecessary increase to the bed utilisation rate as they are normally not accounted for in the hospital's approved catchment population size and the bed capacity.

Another critical issue was the long average length of stay. The study identified that some patients were staying for extended periods of up to 101 days without being discharged from the hospital. The average length of stay in hospitals (ALOS) is one measure of the efficiency with which hospital resources are used

(OECD/WHO, 2012) and, if not properly monitored, it may lead to a high bed utilisation rate and overcrowding of wards. The long ALOS in the hospital could be attributed to various factors which were not explored in this study, such as a possible change in the disease profile or disease burden in the community, shortage of staff, ineffective monitoring and poor management of staff or a rapid increase in the size of the population served by the hospital.

This research has therefore confirmed that current admission patterns at Matikwana Hospital may remain the same for some time unless appropriate interventions are implemented to address the identified areas of concern. This information will therefore assist hospital and district management in planning for appropriate allocation and efficient utilisation of resources and for proper decisions in relation to proportional distribution of healthcare services at community level to address the unnecessary influx of patients at district hospitals.

6.2 LIMITATIONS OF THE STUDY

The following limitations were experienced in conducting this study.

- (a) The study was done for a small number of patients. However, these patients were randomly selected and therefore should reflect a general trend of patients admitted in the hospital.
- (b) Some files were missing, limiting the number of records reviewed during the study.
- (c) Incomplete data in some files had limited the use of all records of patients admitted during the period of the study.

6.3 RECOMMENDATIONS

At hospital level, there is a great need to improve the management of admissions to ensure optimum utilisation of resources. Special focus should be placed on monitoring the average length of stay (ALOS) and the bed utilisation rate (BUR).

Regular ward rounds by doctors to discharge those patients that are ready for discharge, effective nursing interventions and care, good quality data and up-to-date information, sufficient personnel with appropriate training and skills, can help shorten the ALOS by ensuring that right patients are discharged at the right time. This will therefore eliminate the unnecessary usage of beds which is normally associated with high costs of taking care for the patient who does not require continued admission. A lower ALOS, at least at 3.5 days as per the national norm, would ensure resources are available to use for new admissions and subsequently lead to a reduced BUR.

At district level, there is a great need to strengthen primary health care at community level. Areas of special interest would be the availability of enough resources at clinic level to ensure patients do not bypass the clinics, intensifying of campaigns to encourage people to visit the clinics and community health centres to seek early medical attention and treatment before being overcome by illnesses.

Statistical evidence should also be considered when making decisions for deployment of resources, more especially at Primary Health Care level to equitable coverage.

Based on findings of this study, the researcher would like to suggest the following future studies:

- Factors associated with admission for patients admitted in the medical wards of a district hospital.
- Perceptions of patients towards local clinics and community health centres.

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APPENDICES

APPENDIX A: ETHICS CLEARANCE CERTIFICATE AND LETTERS OF APPROVAL

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

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Mr Mabuya Patrick Butiyana

CLEARANCE CERTIFICATE

M110837

PROJECT

Patterns of Admission in Adult Medical Wards of a District Hospital

INVESTIGATORS

Mr Mabuya Patrick Butiyana.

DEPARTMENT

School of Public Health

DATE CONSIDERED

26/08/2011

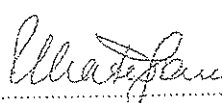
DECISION OF THE COMMITTEE*

Approved unconditionally

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

DATE

26/08/2011

CHAIRPERSON
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor: Maggie D Mokonto

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...

APPENDIX B: DATA COLLECTION INSTRUMENTS

DATA COLLECTION TOOL

RESEARCH TOPIC:

Patterns of Admission in Adult Medical Wards of a District Hospital

Record No: _____

Gender:	M	F
Date of Birth:		
Date of Admission:		
Date of Discharge:		
Diagnosis:		
Employment Status:	Employed	Unemployed
Education Status:	No Education	Primary School
Marital Status:	Single	Married
Separation Status:	Discharged Home	Transferred
Area of residence:	Absconded	Refused Hospital Treatment
	Deceased	