

**THE UNIVERSITY OF ZAMBIA
SCHOOL OF MEDICINE
DEPARTMENT OF COMMUNITY MEDICINE**

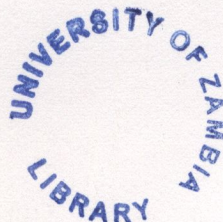
LUSAKA, 1999

**APPROPRIATE USE OF HOSPITAL BEDS IN AN OVERBURDENED TEACHING
HOSPITAL, IN A DEVELOPING COUNTRY, A CASE STUDY OF THE
UNIVERSITY TEACHING HOSPITAL, LUSAKA, ZAMBIA.**

BY

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00528230



**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF COMMUNITY
MEDICINE, UNIVERSITY OF ZAMBIA, IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE DEGREE OF MASTERS OF PUBLIC HEALTH**

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DECLARATION

I, **AARON MWALE**, do hereby solemnly declare that this dissertation represents my own work and that it has not previously been submitted for a degree at this or any other University.

Signed: _____

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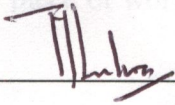
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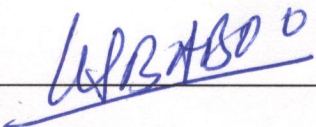
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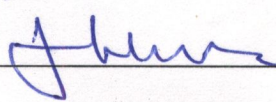
The University of Zambia approves this dissertation of **Aaron Mwale** as fulfilling part of the requirement for the award of the degree of Masters of Public Health.

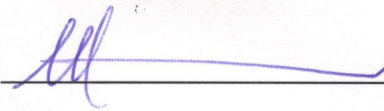
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DEDICATION

With gratitude, I dedicate this dissertation to:

My father who gave so much for our education and my mother for the unlimited support and encouragement. I am very thankful to them for having contributed in many ways towards my education, which has culminated in the production of this piece of work.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

UTH	-	University Teaching Hospital
WHO	-	World Health Organization
ICD 10-	-	International Classification of Diseases Code Version10
JICA	-	Japanese International Development Agency
ODA	-	Overseas Development Association
IBM	-	International Business Machines (TradeMarc)
MEDLINE	-	Automated Database

ABSTRACT

A bed census was carried out on 16th June 1998 in the University Teaching Hospital (UTH) wards to look into appropriate use of hospital beds. The main objectives of the study were to determine the extent of appropriate (Medically necessary) and inappropriate bed use and levels of care to patients admitted to the UTH.

The study also aimed at obtaining accurate information on bed use and designing a feasible and dependable instrument of regular collection of information on inpatients.

The study design was a cross sectional survey of all patients occupying a Hospital bed hence called a bed census. The data required for the study was obtained by administering a structured questionnaire to patients admitted to the UTH wards on a selected day. 56 Nurses who were trained for the exercise performed this. Each Nurse was assigned to one ward on that particular day to interview patients.

The data was analyzed using EPI-Info statistical software. Statistical tests of Chi - Square and regression analysis were used to arrive at appropriate tests of significance of P-Values and correlation coefficient.

It was found out that 37.9 % of the patients had non-clinical reasons for being on the ward (Pvalue=0.000). The proportion of medically inappropriate use for stays of one to six days was significantly higher than average. It was further found out that for those patients with longer stay on the wards, their admission was clinically appropriate. The trend towards decreasing rates of inappropriate hospital use for increasingly longer stays was statistically significant at P-Value = 0.0000.

A test for correlation (Linear regression) gave a result of $r = -0.049$. This result signifies that as stay in hospital increased rates of inappropriate use decreased. Conversely, as stay in Hospital decreased, rates of inappropriate use increased.

The bed census showed bed occupancy of 48.39 % on the day of the census, which is half of the previous year's estimate of 71 %. This happened by chance because on this particular day, some of the wards were congested and some of them were half full in order to prepare bed space for new admissions on the next day.

According to the criteria of the interview, it was observed that 37.9 % of the admissions were inappropriate (Medically unnecessary). It further goes to reveal that 79 % of these could have been handled by the Urban Clinics which shows their failure to handle them. Geographical distances, delayed laboratory and X-ray results and failure to conclude the seriousness of the disease or its recovery were other contributing factors for prolonged occupation of beds in the UTH. 90% of all bed occupants were terminally ill. It would be unethical to reveal the causes of terminal illnesses if one guaranteed the confidentiality of its occupants.

Finally it is concluded that the situation at UTH can be improved but it is necessary now to have a sister Hospital of equal status for the simple reason that the population of Lusaka is no longer 300,000 (1965 when the UTH was built) but more than 2 Million (1998).

Information on bed use is not readily available in the UTH. It is therefore recommended that bed censuses be introduced so as to avail clinicians and management valid information for planning and decision making. Routine bed censuses carried out on two consecutive midnight's are known to offer such information as is not readily available in the routine hospital statistics.

CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND INFORMATION AND UTH PROFILE

The study was carried out in the University Teaching Hospital (UTH), Lusaka, Zambia. UTH is situated in Lusaka, the capital city of Zambia. 'Zambia is a landlocked country covering an area of 752,612 square kilometers and consisting of about 2.5 percent of the areas of Africa'.¹ The country is located in central Africa. Its neighbors are Zaire, Tanzania, Malawi, Mozambique, Zimbabwe, Botswana, Namibia and Angola. 'The population of Zambia is 9.5² million. The population of Lusaka is approximately 2 Million with a growth rate of 5.6 %'³.

Zambia has the fastest growing population in Sub Saharan Africa. 'The population growth of Zambia is estimated at 3.6% annually'⁴.

The UTH was established in 1965 to cater for the referral services of the country. Till 1991, 65% of the total budget of the Ministry of Health was spent around five district hospitals (Kitwe, Ndola, UTH, Livingstone, and Chipata) and of these 90% of the budget went to the UTH.

Despite having a major share of the budgetary allocation, it often runs out of most basic facilities such as drugs, equipment, hospital supplies etc. Lastly but not the least, patient doctor ratio was nearly 1 to 50. Least to say, the conditions of services at the UTH were so poor that morale of workers of all categories was very low. The trained, qualified personnel became a rare entity in UTH. A large proportion of qualified personnel of all staff including physicians went to the neighboring countries for greener pasture.

The inability of the prestigious capital city hospital to cater for the basic needs of the people became a political issue and talking point in the neighboring countries. Quality of health Services became a very big question.

As it is, UTH means everything to all the people of Zambia whether they came from rural or urban areas, lower or upper social economic class. With these sweeping changes, the capital City (Lusaka) faced two dangerous problems. One was the converging of people from all corners of the country towards Lusaka resulting in mushrooming of illegal settlements and shanty compounds. Secondly, these people started flooding the UTH for almost everything (Medical attention) which could have been tackled by health Centers and hospitals situated in other parts of the city. The influx of patients completely depleted the health services and facilities of the UTH. The government took drastic measures to save the UTH from this dangerous epidemic. With the help of donors like Overseas Development Administration (ODA), Japanese International Cooperation Agency (JICA) and the Irish Aid, they uplifted ten clinics in Lusaka Urban into fifty bedded clinics in Lusaka. All referred cases from these clinics would come to the filter clinic in the UTH. These were later siphoned to different disciplines as per their needs. It was expected, with this attempt, the budgetary requirements of the hospital would stabilize, workload would diminish and UTH would once again be able to provide quality health services including tertiary care.

A pilot survey showed that nearly all the wards are overcrowded, patients have been found lying down on the floor. As for Pediatric wards, 2 to 3 babies usually occupy a baby cot that is meant for one baby. The majority of the people did not know the reasons for their admissions. It is a big question and debate to understand the reasons for all this. Investigations have revealed that this hospital exhibits acute shortage of beds. It is faced with high and still increasing rates of bed occupancy to the extent that concerns are being raised about quality of care. Resources available for health care are shrinking due to declining economies. One can understand the impact of increasing population on the health services. This is experienced in the entire developing world. However one fails to comprehend the crisis surrounding UTH to such an extent that Theaters are usually closed, Pharmacies do not have drugs, Laboratories usually run out of reagents and X-ray machines are routinely none operational etc. Is it because of mismanagement? Inability to get adequate budgetary allocations or exaggerated over estimation.

In the UTH information that can be extracted from routine statistics is limited, inaccurate and

incomplete. The most commonly available data being average length of stay in hospital, bed occupancy rates, hospital mortality rates and discharge diagnoses.

Comparison of the hospital statistics over a period of time can give indications about existence of problems, but a more refined analysis for the elaboration of solutions is required for a more sophisticated assessment of the use of hospital beds.

The distribution of hospital beds in the UTH is as follows:

SPECIALITY	BEDS & COTS	LENGHT OF STAY	BED OCCUPANCY RATE (PERCENT)
1. Medicine	232	4	75
2. Surgery	404	5	63
3. Pediatrics	356	4	72
4. Gynecology	190	3	57
5. Obstetrics	356	5	48
6. Neonatology	149	7	55
7. ENT and Eye	46	12	73
TOTAL	1,840	4	64

The above tabulated data is compiled on an annual basis and submitted to UTH management.

1.1 STATEMENT OF THE PROBLEM

'The problem of bed shortages seems long-lasting and acute'⁵. It is pathetic to see patients struggling for floor space in the wards rather than occupying beds because they are already occupied before the arrival of new patients. The solutions are usually very short term.

Mostly clinical staff and the general public will advise that an extra bed be secured or wait for a new hospital to be built. Appropriateness of a patient's admission is rarely considered. In the debates on how the existing bed-stock is used, there have emerged two groups with different views on bed use. The first group is made up of the pessimistic that feel that no more can be achieved unless bed stock is increased. The second group is made up of the optimistic who are prepared to attempt to make better use of existing bed stock.

In discussing appropriate bed use, we need to find out as to whether we really need the beds we claim to be short of and whether we do make proper use of the beds that we have. In most instances, every person who is sick must occupy a hospital bed if the doctor confirms. The question is, can we afford that ideal? Of major concern is the cost of keeping a patient on a hospital bed. This study will try to balance the various views of the optimistic and pessimistic groups to avoid bias. Attempts will be made to assess the methods of analyzing the problem of bed use and review some of the ways that would require their improvement.

It is a priority for any Health care organization that is concerned with monitoring and evaluating its patient care provision facility to maintain and promote a dependable information collection, analysis and presentation mechanism on bed use. In the absence of accurate and up-to-date information, it is virtually impossible to devise workable plans and decisions on bed use.

A Hospital bed census was carried out so as to develop a mechanism of collecting dependable and accurate information upon bed use and to assess the appropriateness of hospital admission on one particular day. The experience has been that UTH is unable to distinguish between the surface problems and underlying dysfunction's of Hospital beds.

There is therefore need to examine three related issues: -

1. The amount
2. The use
3. And the spare capacity of Hospital beds.

This study is designed with one underlying assumption:

That there is a problem and that the problem is worthy of attention. It challenges the belief that the only solution is to spend more money and provide more resources. It seeks alternative solutions.

The major problems are:

- a. Does the Hospital clinicians and Management have adequate information on who is occupying the Hospital beds?
- b. If they have the information, is it accurate, timely and dependable for effective decision making?

One of the objectives of this study is to design an instrument that will improve information collection mechanisms upon Bed use statistics. The study will also evaluate the critical and representative analysis of case mix, patient backgrounds, availability of diagnostic and treatment protocols and many other variables that contribute effectively to a well designed hospital bed use information facility.

CHAPTER TWO

2.0 LITERATURE REVIEW

Sound information on use of Hospital beds can ensure that the Hospital's resources are put to good use and also contribute to the well being of the people who are in need of and are receiving hospital care.

2.1 HOSPITAL BED DEFINED

It is always assumed that the first thing in any illness is to put the patient to bed. Hospital accommodation is always numbered in beds. Illness is measured by the length of time in bed. doctors are assessed by their bedside manners. A bed is not ordered like a pill or a purge, but is assumed as the basis for all treatment⁶. A Hospital bed as such plays a very important role in the treatment of a patient and in the administration of a care facility and can therefore be defined as the basis of all treatment.

2.2 DEFINITION OF TERMS

2.2.1 LENGHT OF STAY.

Length of stay describes how many days on average each patient stays in hospital. It tells how quickly patients are being treated in hospital and returned home. Length of stay refers to the average time that patients spend in hospital. ' It describes how many days on average each patient stays in hospital'⁷. Length of stay is usually influenced by mostly clinical policies of the medical staff, the organizational and administrative habits of doctors and hospitals and the extra - hospital influences of the social environment and availability of paramedical support to which the patient is to be discharged. Organizations and administrative influences include 'strict adherence to ward round discharge days, failure to balance admission and operating days and lack of pressure on hospitals'⁸. Reasons for inappropriate stays classified under social

environment are usually related to inadequate home conditions.

2.2.2 TURN OVER INTERVAL.

Turnover interval refers to the average time that beds stay empty between patients. 'It describes the time between the discharge and the next patient's admission'⁹. For example, a turnover interval of 2.5 days would mean that on average each bed was empty for two and half days between the discharge of one patient and the admission of the next. From the turnover interval estimates, one can conclude that the longer the turnover interval, the less satisfactorily the beds are being used usually to the detriment of patients waiting to be admitted.

2.2.3 BED OCCUPANCY

Bed occupancy refers to how full on average the beds are being kept. A bed occupancy of 75% means that on average three-quarters of the beds were occupied in the period concerned. The earnest thing one can do in the hospital to increase occupancy levels is to keep patients in hospital longer than necessary. To know how intensively beds are being used, there would be need to examine length of stay, Turnover Interval and through put per bed. 'A high bed occupancy rate may be associated with poor medical practice and service to the community'¹⁰.

2.2.4 THROUGHPUT PER BED

Throughput per bed tells how many patients on average are admitted to each bed in say three months, six months or a year. Throughput per bed refers to how many patients on average are passing through the beds. It tells you how many patients on average are admitted to each bed in a period of time. Throughputs of 52 means that on average 52 patients are admitted to each bed in a year. It has been observed that a high throughput can lead to a drop in standards of care. Throughput per bed is an excellent tool for measuring how intensively beds are being used. The formulas for calculating Bed Occupancy, Throughput per bed, Length of stay, and Turnover interval are attached in appendix A.

2.3 APPROPRIATE BED USE

None of the above four measures tells a whole story. They are all simply indicators of areas to which to direct ones attention. Length of stay, turnover interval and throughput per bed are useful for assessing how intensively the beds are being used. Percentage of bed occupancy only tells us how full the hospital or ward is being kept. It is to be noted that People do not go into the hospital to occupy beds, but to have their various illnesses diagnosed, assessed and treated and as far as possible put right. The question of occupancy only arises when the physician decides to admit them and what criteria he chooses to admit them. Problems in that process can be reflected in the bed use statistics.

The above four measures or tools of analysis are commonly used in most Hospitals worldwide. In the University Teaching Hospital, the measures stated above are presented annually to management. The methodologies of collecting information to arrive at these measures are very unreliable making the presented statistics suspicious and questionable. The high cost of providing beds places upon the clinician the need to ensure that bed use is appropriate. Should the patient be admitted? How long should the patient stay? In what type of accommodation should the patient be? Variations in practice are evident in all three areas but the question is, does such variations indicate some inappropriate and unnecessary admission, unnecessary stay, incorrect location and incorrect stay?

These may at first sight appear to be matters of a solely clinical nature, but organizational, demographic and environmental factors can influence the admission and length of stay of patients.

Availability of bed use statistics may influence bed use although few people find bed use statistics exciting. Most clinicians and administrators dismiss them as inaccurate and in any case would not feel that mere figures could help examine a problem such as a shortage of beds. When examining bed use statistics it is only too easy to find errors. There are for example, failures to record ward closures for renovations or to note reductions in bed compliment because of staffing

shortages. Both of these give a false picture of the numbers of beds available for use. Even when staffed available beds are correctly counted, there can be no guarantee that other resources such as theatre capacity or diagnostic facilities can match available beds. In addition to errors of fact, there are also problems of interpretation. Does the hospital bed in any way represent the hospital workload? Such questions can only be answered by examining hospital bed use statistics. Accuracy and completeness during analysis and upon presentation of bed use statistics have always been questionable. Efforts therefore need to be put in to evaluate existing data collection procedures and presentation mechanisms in a bid to identify and reduce errors.

What usually influence accuracy of data is the coding of diagnosis on admission and discharge. Adherence to the coding mechanisms has to be evaluated to confirm its relevance upon patient data collection and presentation. It is a big question if such a mechanism exists in the UTH.

This study in attempting to provide an analytical framework may seem to suggest a straightforward relationship between identifying a problem, choosing a corrective remedy, and achieving successful change. Producing change in an organization like UTH is indeed an awesome task that requires very dependable information.

Bed use studies have been carried out in the United States and United Kingdom. Such studies are rare in Sub Saharan Africa let alone Zambia. Several authors have analyzed the appropriateness of hospital admission in developed countries except for few similar studies in developing countries. This study will be the third of it's kind to be carried out in Zambia. Susan Foster and Anna Buve ¹¹ carried out a similar small-scale study at Monze District Hospital. This was followed up by another study at the University Teaching Hospital by Sims Peter that looked at bed use in the Obstetrics and Gynecology wards ¹². This study covered cover all the 56 wards (1,840 beds) in the University Teaching Hospital.

'Rapidly increasing hospital costs have necessitated review of hospitalized patients to improve the appropriateness (Medical necessity) of hospital use'¹³. Utilization review, the assessment of

the appropriateness and efficiency of hospital care through review of the medical record, and utilization management, deliberate action by payers or hospital administration to influence providers of hospital services to increase the efficiency and effectiveness with which services are provided, are valuable but relatively unfamiliar strategies for containing hospital costs'¹⁴.

What is important in such reviews is to shift from unstructured methods of review using individual physicians. The extent of inappropriate (Medical unnecessary) hospital utilization and the factors associated with it is a subject that has received some attention in developed countries. To the contrary, this subject has not been exploited in sub Saharan Africa let alone Zambia.

Due to the rising costs of running the health care facility need will arise for those who provide, administer, and pay for health care in Zambia to recognize the need for a valid and reliable method of assessing the use of hospital beds. 'Criteria based on diagnosis have proven burdensome, both because of medical advances that result in frequent changes in treatment modalities for particular diagnoses'¹⁵. A hospital bed census in this study has been used to meet the demand for a tool to use in assessing the appropriateness of hospitalization in UTH.

Although economic incentives does decrease hospital use and costs, their consequences for patients' access to health care and the quality of care are controversial. 'To maintain quality and access, it is important to focus cost-containment measures on unnecessary or medically inappropriate services.'¹⁶. 'Several studies have suggested that a substantial proportion of hospital care is medically unnecessary'¹⁷. 'In a study conducted in Baltimore City Hospital, 25 percent of those in other Maryland hospitals, and 28 percent of those in Massachusetts hospitals were judged medically inappropriate '¹⁸. This study is undertaken to answer two main questions: - (1) What is the level of medically inappropriate hospital use in the UTH? (2) What factors are and are not associated with inappropriate use. It is hypothesized that the rate of hospital use in UTH that would be judged inappropriate by objective criteria (Bed Census) would be more than 30 percent.

CHAPTER THREE

3.0 GENERAL AND SPECIFIC OBJECTIVES

3.1 GENERAL OBJECTIVE

- a. To determine the extent of appropriate (Medically necessary) and inappropriate bed use and level of care to patients admitted to the University Teaching Hospital.

3.2 SPECIFIC OBJECTIVES

- a. To obtain accurate, up to date and valid information on patients occupying hospital beds.
- b. To effectively obtain information on bed occupancy, lengths of stay throughput per bed, case mix and access to hospital facilities.
- c. To compare the routine data on inpatient with the census data so as to determine their accuracy and relevance to both clinicians and hospital administrators.
- d. To design and develop an accurate, acceptable, feasible and dependable instrument of regular collection of information on inpatients.
- e. To establish as to whether admission and discharge diagnoses are coded on the hospital wards.

3.3 HYPOTHESIS

It is hypothesized that the rate of inappropriate hospital bed use exceeds 30 % of total admissions in the University Teaching Hospital.

CHAPTER FOUR

4.0 METHODOLOGY

4.1 STUDY SETTING

The study was carried out at the UTH. All patients occupying a hospital bed were interviewed by way of a structured questionnaire. The UTH has 56 wards with a total bed capacity of 1,840 beds. Nurses were recruited and trained on how to carry out the data collection exercise in the hospital wards.

4.2 STUDY DESIGN

This study is called a bed census because it covered the whole inpatient population at UTH on that particular day. Descriptive cross sectional surveys usually cover a sample of the population. When such studies cover the total population it is called a census¹⁹. The study was carried out on 16th June 1998.

4.3 QUESTIONNAIRE

A questionnaire was designed which acted as the main tool for collecting data on the Hospital wards. Trained Nurses were recruited to conduct the interview. Emphasis was laid on the nurse to interview the patient and read the case notes. Thereafter fill in the questionnaire according to the information obtained.

4.4. DISCUSSION WITH CLINICIANS

A sample of clinicians in the four major specialties (Medicine, Surgery, Obstetrics and gynecology and Pediatrics and child health) was interviewed so as to establish their views on the adequacy of patient information on the wards.

4.5 PILOT STUDY

A pilot bed census was carried out in one ward. The ward was randomly selected out of the 56 wards. This was done to pre-test the questionnaire. Few observations arising from the pilot bed census were thereafter incorporated into the final questionnaire.

4.6. CODING OF DISEASES

After the data was collected, the questionnaires were coded. In order to maintain consistency, they were compared with the rudiments of the World Health Organization International Classification of Diseases code Version 10.

4.7 DATA ENTRY AND ANALYSIS

Data analysis and statistical evaluation was by the Epi-Info Version six Statistical Software installed on an IBM Computer. The t-test and Chi-square were used to compute means and proportions respectively. The 95% confidence intervals (CI) for means were calculated using the EPI-Info statistical software. Correlation analysis was used to measure association between continuous variables. The correlation test was performed to measure the extent of the relationship between length of stay in hospital and appropriateness of bed use.

4.8 PERMISSION AND ETHICAL IMPLICATIONS

It would be unethical to invade one's territory and snoop around for information. The Research Ethics committee of the University of Zambia first cleared this study. Immediately after this, it was presented to the UTH Board of Management who not only gave clearance but also funded it as a useful information collection tool.

4.9 STUDY LIMITATIONS

1. Data collections were performed on one day without regard for different admission/discharge days of the different Hospital Units/Firms. This is envisaged to have affected bed occupancy on that particular day.
2. Financial constraints could not allow for a second bed census. Midnight counts of patients by way of a bed census are known to give valid data on bed use. The same census if conducted on two consecutive midnights would offer a valid platform for the calculation of throughput per bed, bed occupancy and turnover interval.
3. Doctors do not do the coding of diagnosis on admission and discharge on the ward. The experience in this study was that it was very difficult to code a patient's diagnosis on the ward. Even after the data was collected reading of diagnosis was difficult. This could have been attributed to the doctor's inability to code diagnoses. Some of the patients did not have a confirmed diagnosis due to delayed radiological or laboratory results. This consequently, does seriously affect reporting on case mix in a Hospital.

In many hospitals world wide, during internship stage, coding sessions are carried out. Each unit at the end of the week goes to the record room for matching of codes against diagnosis. In the event of any discrepancies, they are corrected and right codes given right diagnosis. One does not know if this practice was available in the colonial era. It certainly does not exist in the current practice. This limitation cannot be overemphasized.

CHAPTER V

5.0 STUDY FINDINGS

Every fourth day of the week, each unit in the entire hospital has its own admission day. For example, if a unit was to admit on a Sunday, its next admission day would be the following Thursday. During this time, it is expected that patients would recover and be discharged and leave the bed for a new occupant. However, on the spot observations revealed that nearly 50 % of the patients remain on the beds before the next admission day. Inability to maintain a 24-Hour cycle of bed occupancy was one of the limitations of this study. Perhaps then, it would have revealed and exhibited overestimates of bed occupancy which was not the case in this study.

Even if one wanted, one could not have discharged them because these were terminally ill and their bed occupancy was legitimate. The selection of a particular day to carry out the census was done on the basis of randomly selecting a date, which happened to be a Wednesday. As the census was carried out starting at 08:00 hours in the morning, it ceased to function by mid afternoon when the majority of the wards are overcrowded, as is the case in the UTH. A total of nine hundred and three patients (903) were interviewed on the day of the census. These were the patients who occupied a hospital bed on the day of the bed census. The remainder of the beds (933) were empty waiting for new admissions.

5.1 DEMOGRAPHY AND REFERRAL

903 patients were interviewed on the day of the census. Nine percent of the patients were less than 12 months of age and 9.4% were between 1 and 5 years. 22% were between 5 to 15 years of age. The rest were above 15 years. Sex distribution was 39.6% males and 60.4% females. 36.4% of patients lived in low cost areas, 25.2% in medium cost, 24.3% in high cost and 14.1% came from outside Lusaka (Table 1).

Social economic background is based on income and area of residence. If one would consider income, it was impossible because most of the patients were dependents. However according to income, monthly income between K100,000 to K250,000 is considered to be low-income group. K300,000 to K600,000 middle class and above K600,000 is considered to be high class. It is very disappointing to say that almost 65 % to 70% of the people have an average monthly income of K70,000 and therefore are poverty-stricken. If one is to consider the second option i.e. area of residence, it was easy to find out as shown in Table 1.

Table 1: DISTRIBUTION OF PATIENTS ACCORDING TO AREA OF RESIDENCE.

n = 845

Location	Total	Percentage
Low cost	308	36.4
Medium Cost	213	25.2
High Cost	205	24.3
Out of Lusaka	119	14.1
	845	100

People who come to UTH for medical attention come from all parts of the city of Lusaka and the country. This study show that 11.4% live in the radius of 1km of UTH, 19.2% in the radius of less than 5km of UTH and 49.5% in the radius of more than 5km. A larger proportion of the patients comes from low cost areas. (36.4%)

The commonest form of transport used by patients was seen to be public bus (47.1%). Other modes of transportation were own transport (25.5 %), on foot (16.3%), taxi (7.8%) and ambulance (3.3%).

Table 2: DISTRIBUTION OF PATIENTS ACCORDING TO MARITAL STATUS
n = 866

Marital status	frequency	Percentage
Married	374	43.2
Single	248	28.6
Children (less than 14 years)	166	19.2
Widowed	45	5.2
Divorced	33	3.8
Total	866	100

The above table (Table 2) shows that most of the bed occupants were married (43.2 %) followed by 28.6 % who were single and 19.2 % who were children below 14 years of age. On average, 57% belong to the single entity group. The criterion for literacy was estimated by ones ability to read and write without difficulty. Illiteracy was estimated by ones ability to read but with difficulty and being unable to write. Table 3 shows that most of the bed occupants acquiring educational levels to read and write were 65.8 % of the total. However, the rest of the bed occupants (34.2) were illiterate. They did not acquire any education level and so had difficulty in reading. The study also reveals that the majority of the patients were literate (65.8 %) with 34.2% illiterate. The finding on literacy corresponds with the education levels attained in the patients interview (Table 3).

Table 3: DISTRIBUTION OF PATIENTS ACCORDING TO LEVEL OF EDUCATION

n = 156

Level of Education	Total	Percentage
None	57	36.5
Secondary	49	31.4
Primary	34	21.8
College	14	09.0
University	02	01.3
	156	100

Care was taken to look into the case records of bed occupants on the day of the census. Out of a total of 903 patients, 556 case records revealed that these patients had an alternative to seek health services elsewhere rather than UTH. It is very interesting to note that the majority of these nearly 80 % could have gone to Urban Health Centers for Health care. It is of importance to find out the reasons as to why they did not go to the Health center and instead came to the UTH. Is it because they were terminally ill for which facilities are not available at the Urban Health Center or that they considered UTH as the only place to go to for health services (Table 4).

Table 4: ALTERNATIVE TREATMENT FACILITIES FOR PATIENTS**n = 556**

	Total	Percentage
Urban Health Center	439	79.0
District Hospital	70	12.6
Provincial Hospital	23	04.1
Home	13	02.3
Home care	07	01.3
Rehabilitation Center	04	00.7
	556	100

The mode of admission was mostly referral from urban health centers within Lusaka District (Table 5). Out of 838 patients interviewed, 43 % were referred from Urban Health centers and 34.8 % came through out patient / casualty at UTH. Whether these patients were referred according to the criteria of referring or they did not have the facility to look after these patients is unknown. The study did not investigate this matter.

Table 5: DISTRIBUTION OF PATIENTS' MODE OF ADMISSION

n = 838

Mode of admission	Total	Percent
1. Referred from Urban Clinic	361	43.1
2. Via OPD/Casualty	292	34.8
3. Outside Lusaka	81	09.7
4. Direct to the ward	63	07.5
5. Transferred from UTH ward	37	04.4
6. Other	04	00.5
	838	100

Most of the patients were referred to the UTH by the urban health center (72.0%) as seen in Table 6 below.

Table 6: DISTRIBUTION ON WHOM REFERRED THE PATIENT TO UTH

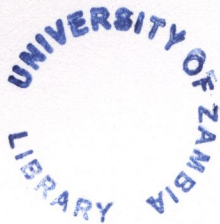
n = 639

Who referred the patient	Total	Percent
1. Urban Health Center	460	72.0
2. District Hospital	69	10.8
3. Specialist Clinic at UTH	46	07.2
4. Self	30	04.7
5. Provincial Hospital	18	02.8
6. Other	16	02.5
Total	639	100

5.2 ADMISSION

Criteria of diagnosis and percentage of receiving the correct treatment is the area that would require in depth study. It would require more time to see whether the treatment was given according to clinical criteria or diagnosis due to laboratory confirmation. Inspection shows that majority of those admitted were terminally ill and had many investigations and therefore required multiple drug therapy.

It was very difficult to combine correct diagnosis and correct treatment. However the author assumes that 98% of the patients had the probability of right diagnosis and receiving correct treatment. It was seen that 97.2 percent of the patients had correct diagnosis with 2.8 percent of patients with wrong diagnosis. 97.6 percent were receiving correct medication. This is merely the finding of the study. As mentioned earlier it is very difficult to justify right diagnosis and right treatment because this was not one of the objectives of the study.



Frequency of being seen by either a Doctor or a Nurse (Table 7) on the ward was found to be favorable. A large proportion of patients had at least been seen once by a doctor (61.6 %) and twice by a Nurse (42.4%). It should not go unnoticed in this regard that only 150 patients answered the question as to who had seen them on the ward. The rest could not identify who came to seem them but responded positively that somebody was seeing them and nursing care was been given.

Table 7: DISTRIBUTION OF PATIENTS BEING SEEN BY A DOCTOR AND NURSE

n = 151

	DOCTOR		NURSE	
	Total	Percent	Total	Percent
None	40	26.5	01	0.7
Once	93	61.6	31	20.5
Twice	17	11.3	64	42.4
Several	01	0.7	55	36.4
Total	151	100	151	100

5.3 CLINICAL REASONS FOR PATIENT BEING ON THE WARD

Of the 606 patients that had clinical reasons for being on the ward, table 8 gives a breakdown of the major reasons for patients being on the ward for clinical purposes: -

Table 8: DISTRIBUTION OF CLINICAL REASONS FOR PATIENT BEING ON THE WARD

n = 606

Clinical reason	Total	Percent
1. Monitoring and dose change	270	44.5
2. Medical monitoring daily	240	39.6
3. Wound care and drainage	42	06.9
4. Daily injections	28	04.6
5. Physio/traction	23	03.8
6. Other reasons (clinical)	03	00.6
	606	100

Daily injections, physio/traction and other reasons in this distribution might not be considered for critical reasons for keeping a patient on the ward. Figure 2 shows that most of the patients had monitoring and dose changed as a major reason for occupying a hospital bed. This accounts for 44.5 percent of patients who had clinical reasons for staying on the ward. This is followed by medical monitoring daily at 39.6 percent. A total of 606 patients (67.1%) of the total patients (903) had clinical reasons for staying on the ward.

5.4 OTHER REASONS FOR PATIENT BEING ON THE WARD.

Of the 297 patients who had no clinical reasons for being on the ward table 9 gives a breakdown of the distribution of patients and their reasons for being on the ward for with no clinical reason.

Table 9 DISTRIBUTION OF PATIENTS' NONE CLINICAL REASONS FOR BEING ON THE WARD

N=297

None clinical reasons	Total	Percent
1. Awaiting transfer Home	85	28.6
2. Uncertainty / Re compliance	65	21.9
3. Awaiting transfer in UTH	60	20.2
4. Uncertain medical /Nursing after care	59	19.9
5. Inadequate social support at home	28	09.4
	297	100

Table 9 shows that among the other reasons for patients still being on the ward; awaiting transfer home (28.6), is the highest followed by uncertainty/ recompliance (21.9%). Transfer in UTH (20.2%) also account for a substantial proportion of patients occupying hospital beds with non-clinical reasons. Of the 903 patients, 297 (32.9%) stayed in the hospital even after being discharged. These had no clinical reasons for staying on the ward.

If this problem could be addressed perhaps congestion in the wards could be reduced and depreciation of the hospital furniture could be avoided which are already in a chaotic stage awaiting replacement with new beds and linen.

There were some other delays that compounded patients' non-clinical reasons for staying on the wards. It has been observed that inappropriate use of hospital beds is further compounded by the erratic availability of supplies and facilities. Table 10 gives the most prevalent factors that contribute to patients' delays in discharge or medication on the ward.

It was seen that 193 patients had delays (Table 10) associated with laboratory results (44%), radiological results (25.4%), drugs (23.3%) and blood transfusions (6.2%). On the day of the study, theaters were not operating except for emergencies. Declining economies of scale have adversely affected the operations of the UTH leading to consistent erratic supply of drugs, laboratory reagents, medical and surgical supplies. This often leads to keeping patients on the wards as they wait for the necessary supplies to be made available.

Findings of Table 9 and 10 are important and unavoidable if the UTH could tighten its position, management and treatment can be carried out without delays followed by quick recovery and immediate discharge.

**Table 10: DISTRIBUTION OF OTHER FACTORS LEADING TO PATIENTS’
UNNECESSARY STAY ON THE WARDS**

n = 193

Delays	Total	Percent
1. Delays in laboratory results	85	44.0
2. Delays in radiological results	49	25.4
3. Delays in drugs	45	23.3
4. Delays in blood transfusion	12	06.2
5. Other delays	02	01.0
	193	100

In this study, reporting on case mix was very difficult since only 280 (30%) cases out of a total of 903 could be coded using the World Health Organization International Classification of Diseases and Injuries Code version 10. This is seen to adversely affect reporting on case mix on the Hospital wards. The indication is that it is not possible for Management and Clinicians to know the most prevalent cases on the UTH ward. As such, it is very difficult to gather dependable and reliable information on case mix.

Table 11 gives a distribution of case mix in the UTH out of the 280 that were coded.

TABLE 11 DISTRIBUTION OF CASE MIX

N=280

ICD	Description	Total	Percentage
B50.9	Plasmodium falciparum Malaria unspecified	72	25.7
A16.2	Tuberculosis of lung, bacteriological and horological examination not done	62	22.1
E46	Unspecified protein energy malnutrition	26	9.3
I51.9	Heart disease, unspecified	10	3.6
J98.9	Respiratory disorders, unspecified	9	3.2
R44.8	Other and unspecified symptoms of sensation and perception	8	2.9
K52.9	Non infective Gastro-enteritis and colitis	7	2.5
N39.9	Disorders of urinary system	6	2.1
Other	Other diseases	80	28.6
		280	100

Of the 903 patients occupying a hospital bed on the day of the census only 2.6% had their blood taken for HIV/AIDS test. Of these, 50% had positive results and the rest were negative. From this study, it was not possible to estimate the prevalence of HIV/AIDS on the UTH wards. This is because the number of those that had their blood taken for HIV/AIDS test was relatively small.

A patients gender and being on the ward for no clinical reasons was not significant at P-Value 0.5285 (chi-square = 3.18 and Df = 4). The implication is that a patients gender does not have a direct influence on staying on the ward for non-clinical reasons. (Table 12).

If grouped together, single, divorced, and widowed was the second largest group of admissions. These are often found to be careless and are often subject to problems requiring admission in hospital. This study also found that those who are single are bound to be unemployed with no social economic support. It is therefore interesting to note that a large proportion of the bed occupants were illiterate, single and unemployed.

Age was seen to have significant influence on patients staying on the ward for non-clinical reasons (Table 12) at P-Value = 0.00000 (chi-square = 254.57, Df = 232). Age had a range of a minimum of one day and a maximum age of 88 years with 9 % of patients less than 1 year old. The median age was 27 years and mean age was 33.151 years. Ages less than 17 years fell in the 25th percentile and ages less than 40 fell in the 75th percentile. Further analyses of employment status shows that 62.3 % were unemployed and of these 28.6 % were single. This confirms that a large proportion of patients being attended to in the UTH with non clinical reasons were due to social economic factors for example no social support at home, non-compliance, uncertainty and unavailability of transport. A mean age of 33.15 years and a median age of 27 years is a further indication that the average age of patients in the UTH are men and women who are predominantly young, single and unemployed. Their marital status and employment status (not employed) has a significant influence on being on the ward for non-clinical reasons. In this study social demographic factors are seen to significantly influence a patients stay on the ward for non-clinical reasons.

A deliberate policy by hospitals to provide reliable transport for such patients would significantly decongest the Hospital of inappropriate admissions. Even though transport is a necessity, will the economic logistics allow provision of this facility free of cost?

Education levels of patients had a significant influence on patients stay on the ward for none clinical reasons (Table 12) at P-Value 0.01849591 (chi-square = 24.30 and Df = 12). The study finding gave a frequency distribution of 36.5 % patients with no education and 21.8 % with primary school level of education and the rest 31.7% with Secondary School and University education.

A further analysis of Length of stay gave the following result: The minimum stay on the ward on that day was less than one day (Hours). The mean stay was 10.219 days and 28.036 Standard deviation (SD). The median stay was 4 days and the mode was 2 days.

A statistical test of regression analysis was performed to establish the magnitude of the relationship between length of stay on the ward and non-clinical reasons for patient staying on the ward. The test result was that $r = -0.049$. This result shows that there is an inverse relationship between length of stay and non-clinical reasons for staying on the ward. Chi-square test was also done giving statistically a significant result of $P = 0.00000$ (Table 12).

A test of significance to establish the relationship between primary diagnosis and non clinical reasons for a patient staying on the ward gave a significant result of $P = 0.0000$ (Table 12). This could be attributed to the lack of confirmed diagnosis and inability to code all the diagnosis thereby associating diagnosis with stay on the ward for none clinical reasons. A more refined analysis would be required to confirm this finding especially when all the diagnoses have been coded.

5.5 DISCUSSIONS WITH CLINICIANS

A sample of clinical staff was taken and a formal discussion conducted to establish their view on bed use in the UTH. It was observed that levels of appropriateness of bed use in the UTH have not been considered as a matter of concern. For those interviewed, they expressed that routine Hospital audits would be of benefit although resources to conduct them would not be readily available. The general view was that it would be very important to conduct exercises that measured appropriateness of Bed use in UTH. Concern was also raised on the quality of statistics that are presented on hospital mobility and mortality. Case mix information was not well presented there by causing many clinicians to disregard hospital statistics. The lack of quality information was seen to affect planning for the whole Hospital.

The use of a bed census was not seen to be a good alternative for the collection of quality information upon bed use by clinicians. Though most of them agreed that coding of diseases does affect reporting on case mix in the hospital, they expressed reluctance to be involved in coding of Diseases. Currently medical record clerks who are basically not trained for the exercise do the coding. This observation does to a large extent affect reporting on case mix. What came out from these discussions was that bed use statistics are not available in UTH and that there is need to devise a mechanism of collecting this information and that clinicians must be given accurate information on bed use if at all this information was to be collected. The concern of most clinicians was on the accuracy and validity of the collected information in the UTH.

5.6 COMPARISON WITH ROUTINE STATISTICS

The bed occupancy on the day of the study was 48.39 %. The annual bed occupancy for 1997 was 40%. Variations in these statistics would need further investigation to establish the actual Bed Occupancy rate over a period of time. Average Length of Stay (ALOS) in this study was found to be 10.219 (mean) Days. The routine Hospital statistics gives an average length of stay

of 6.1 days (UTH 1997 annual returns). Throughput per bed and Turnover interval could not be calculated with one bed census data. There would be need for two bed censuses (2 consecutive censuses in 48 Hours to compute these measures). On the other hand, these measures are not computed in the routine UTH statistics. This further compounds the problem of measuring how intensively hospital beds are used in UTH.

The above four measures of bed use are known to give a clue on how intensively hospital beds are used. The observation is that Turnover interval and Throughput per bed is not usually computed in UTH.

CHAPTER VI

6.0 DISCUSSIONS AND IMPLICATIONS

'Some medically inappropriate use of Hospital beds is associated with delays as the patients' time of discharge approached'²⁰. 6.7 percent of the patients interviewed on that day were discharged although they were still on the ward and still occupying a hospital bed. Of these, almost 2.3 percent had been cleared for discharge the day before or they were simply waiting for transportation home or to another facility. From the study, it was observed that it was the sickest patients that are most in need of hospital care who stay long in hospital.

Social economic factors that affect inappropriate use of Hospital beds include: -

Whether there was a responsible person at home or whether transportation home was available. It was not surprising to find inappropriateness rates for children's' hospitalization appreciably less than those for adults. The difference probably results from the presence of built-in caregivers at home for almost all the children. Where as many adults especially the elderly, are inconveniently solitary in this regard.

Patients are admitted to receive diagnostic and/or therapeutic attention at a level easily achieved as outpatients and patients ready for discharges are nevertheless kept in the hospital. Medical resources can be put to better, more effective use without sacrificing health. In the extremely technical facilities of today's care, hospitals should be more successfully used when they and their personnel can concentrate on the care of those who really need them, undiluted by the presence of even 10 percent or 20 percent of patients who are inappropriately there.

The overall proportion of inappropriate admission was 297 (32.9%) out of 903 patients interviewed. This supports the hypothesis that the percentage of inappropriate bed use in UTH is greater than 30 %. The proportion of medically necessary admissions was 67.1 %. On the day of the census, patients occupied 903 beds out of 1,840 beds. A total of 933 beds were empty (51.0%).

Of the 903 patients on the ward on that day, 79.0% (Table 4) could have been attended to at Urban Clinics. On the other hand, a large proportion of patients (43.1%) (Table 5) were referred from urban clinics. The indication is that only 26 % of the referred patients were properly referred. This observation needs further investigation to determine quality of the referral system. From the point of view of the study, the Urban Clinic acts as merely a transit point where patients go for treatment and be referred to the University Teaching Hospital if necessary.

On the day of the study, 2.6% of the total patients had HIV/AIDS test done and out of these 50% had a positive result and 50% had a negative result. In Zambia, HIV prevalence is reported to be 33%. It would be assumed that a similar percentage of 33% could be occupying the hospital beds.

Since only 2.6% of the patients had the HIV test done, it would be difficult/impossible to know the prevalence of HIV/AIDS on the UTH wards.

It will be an underscore if one did not mention that HIV testing is not mandatory in Zambia. Sentinel surveillance figures show that approximately one third of all antenatal mothers are seropositive. In another study it was shown that nearly 80% to 90% of all terminally ill people are seropositive²¹.

If a deliberate policy on HIV/AIDS patients were introduced for example to discharge them to home care, a larger proportion of beds would be made available to the patients.

36% of patients had no education at all. A test of significance shows a P-value of $P=0.0000$. This indicates that levels of education have an influence on admission. Employment was also seen to be significantly affecting admission at P-value 0.00000 with 62% of patients being unemployed. Literacy has also significantly been attributed to admission with 44.5% of patients being illiterate. A test of significance gave a P-value of 0.000

Although it was expected that the rates of inappropriate use would increase with increasing

length of stay, the opposite was the case in this study. The proportion of medically inappropriate use for stays of one day and stays of two to six days was significantly higher than average. The trend towards decreasing rates of inappropriate hospital use for increasingly longer stays was statistically significant at P-Value = 0.0000 (by chi-Square test for linear trend). A further test for correlation (Linear regression) was done to test the relationship between length of stay in hospital and rate of inappropriate use. A correlation coefficient of $r = -0.049$ was arrived at signifying that there is an inverse relationship between length of stay on the ward and inappropriate bed use. As stay in hospital increased, rates of inappropriate use decreased. Conversely, as stay in hospital decreased, rates of inappropriate use increased. Both the test of Chi-Square for linear trend and linear regression do confirm that the longer the hospitalization lasted, the lower the rate of inappropriate use. Other studies have indicated inappropriate use

of hospital time could have been avoided through better use of out patient services and urban Health centers as the case may be for Lusaka district. This is so because 'inappropriate use of hospital beds has been significantly associated with lengths of stay of 1 day to 6 days'²². These findings further confirm the clinical wisdom that 'it is the sickest patients, those most in need of medical care, who stay in the Hospital longest'²³. A similar study conducted in Kensington, Chelsea and West Minister, London in 1996 further established that a 'higher proportion of patients occupying hospital beds are those who no longer require Hospital care, but for whom alternative services are unavailable'²⁴.

CHAPTER VII

7.0 CONCLUSION

The kind of terminally ill patients who come to the UTH are mostly, Tuberculosis relapses, Meningococcal and Cryptococcal meningitis, cerebral malaria and diagnosed immuno suppressed patients. Besides these some chronically ill patients come who belong to the category of hypertension, diabetes and old age. In the surgical wards, admissions can be from two days to two weeks if it is a multiple fracture requiring management and traction. In the Obstetrics wards, nearly 65% of admissions are due to deliveries, which can be discharged on the alternative days if there are no complications. It should not be forgotten that sometime after a major surgery like raparatomy, caesarian section etc patients do not stay in the hospital for more than 3 days.

If one is to do a detailed study these patients would be seen to occupy the hospital bed for very long periods for the physician to be totally satisfied to discharge a particular patient. Due to unforeseen circumstances, a physician fails to perform his or her duties in this respect and discharges them on compassion in an attempt to acquire a vacant bed so as to create room for new admissions who are also in the same category of terminally ill patients. An estimate shows that nearly 90% of all patients who come to the UTH either by chance or through referral system are seriously ill. In circumstances like these, some of the important conclusions of the bed census are amazing if not remarkable. Out of a total of 903 patients occupying hospital beds who were interviewed, 327 of these belong to the single entity where as 374 of these were females and 40% were males. A majority of these had some amount of education level. 43% were referred to UTH and another 35% came through the casualty as admissions. Their unemployment status speaks for their social and economic background and geographical location from where they came from. The study reveals that the majority of these came from high-density shanty compounds from where large proportions of Lusaka residents come from. This study reveals that some of the admitants could have been treated in Urban Health Centers rather than being referred to UTH. This did not happen because facilities in these Clinics are

also depleted.

However it cannot go without mention that 32.9% of the bed occupants could have been discharged earlier, leaving the beds for more serious admissions rather than keeping them on the floor. In more densely populated countries like India and china, more closely related, our neighbors in Tanzania and Kenya, patients do not remain on the wards because of shortage of transport where as in Zambia transport is expensive and unaffordable. This is a universal problem throughout the country. 65 of these patients remained in the Hospital because the doctor was not sure about the progress of the illness and the patient did not know whether he would be able to get the same medical and Nursing care at home. Other reasons relate to clinicians failing to acquire the results of laboratory and radiological investigations on time.

It is now very clear that despite the governments concern to decongest the hospital, admission loads are still very high. All the Units/Firms take special care to ensure vacancy in their respective wards in order to prepare for new admissions on every fourth day. It should not be forgotten that the overcrowding is taking place despite the uplifting of ten Urban Health centers in Lusaka and channeling entry into the UTH through filter clinic and the referral system.

It seems that one of the major contributing factor for people to be terminally ill requiring prolonged admissions, management, Nursing care and other compliance is the HIV/AIDS pandemic, Tuberculosis, Malaria and poverty of the community.

UTH fulfills an important role as a tertiary referral center especially for patients residing outside Lusaka. In addition, UTH is serving as a point of first medical contact, as well as a general, specialist and super- specialist hospital for Lusaka. Its future role as a tertiary hospital needs urgent redefinition within the context of an overall health plan for Zambia.

Given the financial crisis confronting tertiary hospitals, specific areas of inappropriate use must be identified. 'A failure to do so may lead to across-the-board Cuts that could include appropriate and inappropriate services'²⁵.

Further research, especially of a Cost-benefit nature is needed to decide how best to redirect scarce medical resources to reduce inappropriate bed use.

To improve the use of our Hospital beds we must be more scientific in our approach to the problems faced and yet at the same time recognize the reality of uncharted waters of organizational behavior. 'Change in performance can only be achieved when attitudes also change'²⁶. Management task is to ensure that changes are 'made quickly and for better. In order to do this, we need a collection of analytical and behavioral skills'²⁷.

CHAPTER VIII

8.0 RECOMMENDATIONS

Currently, the UTH is facing a shut down because of its inability to guarantee their employees good conditions of service, provide a good infrastructure to work in which includes smooth functioning of operating theaters, quick outcome of laboratory investigation and availability of drugs and nursing care. Further investigations show that since the last ten years, even though the government took special interest to uplift the UTH which looks beautiful from outside, successfully camouflaging the problems of the Hospital, it is in serious financial crisis resulting in frequent changes in its administrative set ups. Who is to blame for this crisis? This is a big question. It is pathetic to see some of the hospital beds which patients have been occupying are from the colonial era, which is more reflective in the old pediatric wing of the UTH. The boilers, autoclaving machinery and catering equipment requires a special look. Major factors contributing to the overcrowding of the UTH are terminal illnesses of the people, inability of the hospital to render immediate services and attention which is responsive for their prolonged stay.

It should not be forgotten that the history of the UTH reveal that it was set up in 1965 at a time when it was catering for a population of 300,000 Lusaka residents plus referrals from all over the country. Since then, the population and the residential areas of the city of Lusaka has increased by nearly sixfold. One cannot tell as to when this trend is ever going to end. Even though the government is to bail out the debts of UTH and guarantee good conditions of services to its workers, still one wonders if it would solve its problems. There is a probability that with donor funding the laboratory services, the drug situation and infrastructure may improve.

One would like to believe the outcome of the study to justify its funders.

If compliance could be catered for, and necessary services could be rendered, bed occupancy could be decreased and there would be no prolonged and unnecessary admissions. This proves one of the hypotheses of the study, prompting for the construction of another Hospital.

The boundaries of the city of Lusaka extends beyond the independence stadium on the north and reaching up to Kafue in the south and up to Chongwe in the east and up to 20Km from the city centre towards Lusaka west. These are the geographical areas of the city of Lusaka, which encompasses an estimated population of 2.2 Million along with its residences. With this background, even if one upgraded 20 urban clinics, it cannot cater to the needs of terminally ill people. Therefore, it is recommended that the government take immediate steps in improving the bed situation of the UTH as a long-term measure. As a short-term measure it is recommended that another Hospital be constructed.

It is further recommended that a national health policy be enacted whose objective will be to improve efficiency of hospital utilization. To evaluate programmatic interventions with this objective, measures of appropriate hospital care are a fundamental need. In order to meet this objective, the health care providers must be able to determine when and why health resources are misutilized so that corrective action may be taken.

As a practical means of assessing the extent of, and possible reason for unnecessary hospitalization, 'hospitals need to review periodically their admissions, utilizing systematically collected data and the contribution of unbiased observers so as to make up an internal audit of admission policy'²⁸.

Creative solutions are needed to address delays related to discharge planning. A substantial proportion of admissions to UTH (79.0%) come from the urban clinics of Lusaka region. 28.6% of the patients on the ward with non-clinical reasons are due to no availability of transport to return home. Hospital transport to return discharged patients home could reduce unnecessary hospitalization and improve bed use. Recent American data show 'high rates of unnecessary hospitalization due to social factors among children infected with the human immunodeficiency virus'²⁹. 'Any attempts to reduce unnecessary hospital days need careful consideration of the costs and benefits of redirecting resources'³⁰. Home care is one possible solution for long-stay patients.

Lastly but not the least, it should not be forgotten that 'effective and pragmatic management would ensure that the limited available resources are utilized on priority requirements/areas in a cost - effective manner'³¹

If a hospital is to be revitalized, restoration of public confidence and motivation of its employees, a strong management team with good funding is a prerequisite. This does not rule out earlier recommendations for another hospital that also would require the same strategy as has been recommended for the UTH.

CHAPTER IX

9.0 FINAL CONCLUSIONS AND RECOMMENDATIONS

It was a pleasure to have conducted the study. It would be recommended that the use of a bed census be introduced in UTH to aid in assessing appropriate bed use. 'Its interest resides not only in the actual data that are collected, but also in the process of reflection and consensus building at all district level that is needed to draw up the list of criteria against which the appropriateness of use of hospital beds will be judged.'³¹ 'Short term flexibility in patient admissions and discharges are good but long term management of hospital census trends needs to be improved by developing the system of controlling patient admissions and discharges'³. Need for clinicians to code diagnosis on admission and on discharge is of major concern .If this can be embarked on; reporting on case mix will be improved on in the UTH.

The findings are acclaimed to be true by the author and his supervisor, any clarifications pertaining to the study can be acquired from its data bank, which is in the UTH itself. Finally, it would be most inappropriate if one did not offer sincere thanks to the funders of this study, which incidentally happens to be the UTH, who will be the major beneficiary of the outcome of the study. The changes and the visions of the country appear very attractive and if it is true then the UTH and the Hospital, which is recommended to come in the future, has better sustainability.

"Great is that country which caters to the needs
of its people and leaves up to their expectations" (KSB)

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Appendix 2. FORMULAS

THE CALCULATION OF THE COMMON MEASURES OF BED USE

1. Percent bed occupancy -
$$\frac{\text{Occupied beds} \times 100}{\text{Available beds}}$$
2. Length of stay -
$$\frac{\text{Occupied beds} \times \text{days in period}}{\text{Discharges and deaths}}$$
3. Turnover interval -
$$\frac{(\text{available/occupied beds}) \times \text{days}}{\text{Discharges and deaths in the period}}$$
4. Through put per bed -
$$\frac{\text{Discharges and deaths}}{\text{Available beds}}$$

Appendix 3

THE BARBER-JOHNSON DIAGRAM

Two enterprising health service operational research experts, Barry Barber and David Johnson, produced a diagram which can be used to show all the four measures at the same time (Diagram)

You will see that the measures of *time* form the two axes of the diagram and that *occupancy* measures radiate from the point where the two axes meet.

A point anywhere on this diagram is all that is now required to indicate all four of the measures of bed use.

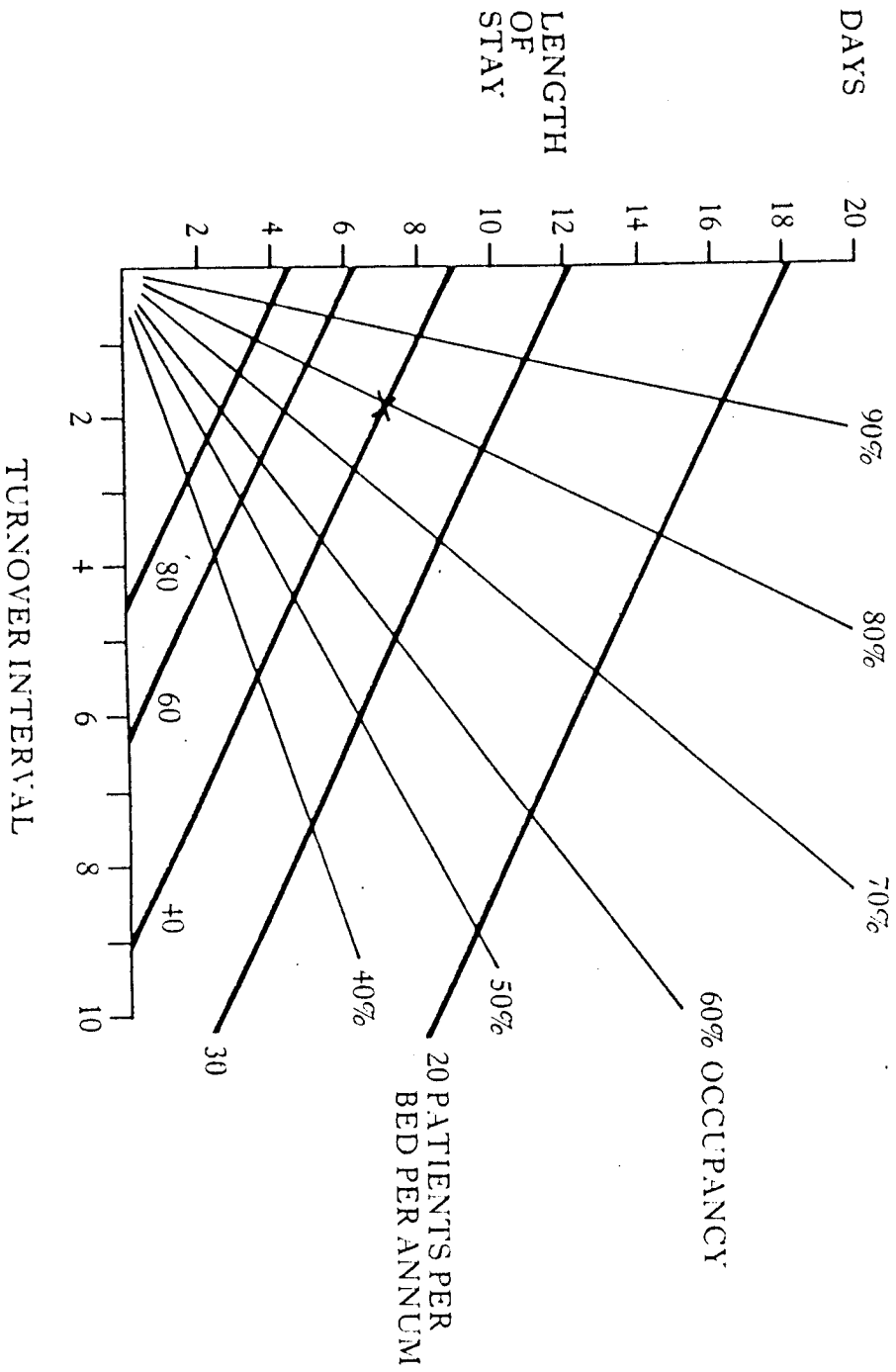
As an example, a cross appears on the diagram. It happens to be exactly where two lines intersect: follow one of them diagonally upwards, and you will find an occupancy level of 80 percent; follow the other diagonally to the right, and you find a throughput of 40 patients per bed per annum. Look to the left, and you will find that the cross is roughly in line with a length of stay of 7 and a quarter days; look down, and you find that the cross is directly above a turnover interval of between 1 and 3 quarter and 2 days.

Notice particularly that the more intensively beds are used, the closer the cross on the diagram moves to the corner where the two axes meet (the bottom left-hand corner).

Of the many uses to which the Barber-Johnson diagram is put, perhaps one of the most interesting shows changes over time.

(Adopted from the Book: From figures to Facts by Christopher Day page 127)

THE BARBER - JOHNSON DIAGRAM



University of Zambia

School of Medicine

Department of Community Medicine

Study Title: Appropriate use of Hospital Beds in an Overburdened Teaching Hospital in a developing world.

A case study of the University Teaching Hospital, Lusaka, Zambia.

I. INSTRUCTIONS

- a. Please read through the questionnaire. If you have any questions, do not hesitate to ask the principal investigator.
- b. All questions to be answered by the patient and the questionnaire to be filled in by the research assistant (Reference can also be made to Case notes).
- c. Circle clearly the appropriate answer/option.

II. DEMOGRAPHIC DATA

1. Name of patient:.....
2. In-patient No:.....
3. Bed No.:.....
4. Date of Birth:../../..
5. Age:.....
6. Sex: 1 = Male,
2 = Female
7. Residential Address: 1 = low, 2 = medium, 3 = high, 4 = out of Lusaka
8. Marital Status: 1 = Single, 2 = Married, 3 = Divorced, 4 = Widowed,.
9. Household income per month: K.....
10. Distance between UTH and patients home:.....Km

11. Distance between patients home and the nearest clinic?.....Km
12. Form of transport used to come to UTH: 1 = Taxi, 2 = Public bus, 3 = Bicycle,
4 = Foot, 5 = Own transport
13. How much money has the patient spent on coming to UTH? K.....
14. (Literacy): Patient reads English: 1 = very well, 2 = with difficulty, 3 = not at all
15. Education status of the patient: 1 = none, 2 = primary, 3 = secondary, 4 = collage,
5 = university
16. Type of employment of the patient: 1 = not working, 2 = Farmer, 3 = Regular,
4 = Casual, 5 = Self employed
17. How many beds are there on this Ward?.....
18. How many patients are there on this Ward?.....

III. ADMISSION INFORMATION

19. Department:..... 20. Speciality:..... 21. Name of the Ward:.....
22. Date of admission:.././.. 23. Time of admission:.....
24. According to your opinion, is this the right Ward for the given diagnosis:
1 = Yes, 2 = No
25. Was this an emergency admission: 1 = Yes, 2 = No
26. How long did it take the patient to be given a hospital bed from time of admission?
1 = less than 30 min., 2 = 3 to 1 hr, 3 = 1 hr to 2 hrs, 4 = more than 2 hrs.
27. How long has the patient been on this ward (length of stay):..... days
28. Could the patient have been attended to elsewhere? 1 = Yes, 2 = No
29. If yes to question 28 where in particular? 1 = home, 2 = urban health clinic,
3 = district hospital, 4 = provincial hospital, 5 = rehabilitation center,
6 = home care center.
30. Has the patient been discharged? 1 = Yes, 2 = No
31. What was the mode of admission? 1 = direct to the ward, 2 = via OPD/Casualty/Filter,
3 = transfer from UTH Ward, 4 = referred from urban health center, Lusaka, 5 = referred
from outside Lusaka, 6 = Other: Specify.....
32. Is he/she a referred patient? 1 = Yes, 2 = No,

33. Name of clinic/hospital referred from:.....
34. If the patient was referred, who referred? 1 = Self referred 2 = specialist clinics at UTH, 3 = urban health center, 4 = provincial hospital, 5 = district hospital, 6 = other: Specify:.....
35. How much money did you spend on medication before coming to UTH: K _____

IV. DIAGNOSIS.

36. What was the primary diagnosis: _____ 37. ICD Code: _____
38. What other diagnosis was given: _____ 39. ICD Code: _____
40. Having seen the patient, in your opinion, is this the correct diagnosis:
1 = Yes, 2 = No
42. Number of times patient seen by a Doctor to day? _____
43. Number of times patient seen by a Nurse today? _____
44. Who else saw the patient today: _____ 45. How many times: _____

V REASONS FOR PATIENT BEING ON THE WARD

46. Clinical reason for patient being on the ward:
- a) frequent monitoring and dose change: 1 = Yes, 2 = No
 - b) medical monitoring daily: 1 = Yes, 2 = No,
 - c) wound care/drainage: 1 = Yes, 2 = No
 - d) daily injection: 1 = Yes, 2 = No
 - e) uncertain medical/nursing after care,
 - f) other(Specify) _____
47. None clinical reason for patient being on the ward:
- a) awaiting transfer in UTH: 1 = Yes, 2 = No
 - b) awaiting transfer home: 1 = Yes, 2 = No
 - c) uncertainty/recompliance: 1 = Yes, 2 = No
 - d) inadequate social support at home: 1 = Yes, 2 = No

- e) uncertain medical/nursing after care,
- f) other (Specify):.....

48. Other delays contributing to patient still being on the ward:

- a) delays in laboratory results: 1 = Yes, 2 = No
- b) delays in radiology results: 1 = Yes, 2 = No
- c) delays in blood transfusion: 1 = Yes, 2 = No
- d) delays in receiving prescribed drugs: 1 = Yes, 2 = No
- e) other (Specify)_____

49. What is the condition of the patient? 1 = improving, 2 = worsening, 3 = no opinion

50. Could you suspect HIV infection in the patient: 1 = Yes, 2 = No

52. If HIV test has been done, what was the result? 1 = positive, 2 = negative

Questionnaire filled by:_____

Date:_____

THE UNIVERSITY OF ZAMBIA

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

29 April 1998

The Managing Director
UTH - Board of Management
P. O. Box RW 1X
LUSAKA

Dear Madam,

re: APPROPRIATE USE OF HOSPITAL BEDS IN AN OVERBURDENED
TEACHING HOSPITAL - A CASE OF UTH

The above study refers.

Kindly allow Aaron Mwale (MPH - Student) to proceed with data collection in the UTH wards. The study is scheduled for 13 May 1998. It has been suggested that he utilises the services of student nurses (3rd years) for initial data collection. The study was already approved by the University of Zambia Research and Ethics Committee.

Yours faithfully,



Dr Baboo

MPH - COURSE CO-ORDINATOR



University Teaching Hospital

(Board Of Management)

P/Bag RW I

LUSAKA - Zambia

Tel: 253947 (Switch board)

250357 (Direct)

Fax: 250305

Telex: ZA 40299

Our Ref: UTHB/EDO/

Your Ref:

7th May, 1998

Dr K.S. Baboo
Course Co-ordinator
Dept. of Community Medicine
P.O. Box 50110
LUSAKA

Dear Dr Baboo

**re: APPROPRIATE USE OF HOSPITAL BEDS IN AN
OVERBURDENED TEACHING HOSPITAL - A CASE OF
UTH**

I am in receipt of your letter dated 29th April, 1998 on the above stated subject.

I wish to inform you that we have no objection to your request to allow Mr Aaron Mwale (MPH - Student) collect data in the wards.

By copy of this letter, the Heads of Departments are hereby informed.

Yours sincerely
UTH BOARD OF MANAGEMENT

Dr E.M. Chomba
MANAGING DIRECTOR

c.c. Heads of Depts.

/mm

APPENDIX 7



THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Telephone: 252514/292884
Telegrams: UNZA LUSAKA
Telex: UNZALU ZA 44370
Fax: + 260-1-253952

PO BOX 32379
Lusaka Zambia

Your Ref:

Our Ref:

23rd February 1998

Mr A Mwale
Department of Community Medicine
School of Medicine
U T H

Dear Mr Mwale

MASTER OF PUBLIC HEALTH PART I FINAL EXAMINATION RESULTS
1997/98

On behalf of the Board of Graduate Studies of the Directorate of Research and Graduate Studies, I am pleased to inform you that you have satisfied the examiners for the requirements of Part I of Master of Public Health.

You can now proceed on to Part II of your programme.

CONGRATULATIONS

Yours sincerely

Geoffrey Lungwangwa (Dr)
D I R E C T O R

cc Assistant Dean (Postgraduate) - School of Medicine.
Head - Department of Community Medicine

The University of Zambia



DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

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Fax: + 260 - 1 - 253952/290258

P O Box 32379
Lusaka Zambia

Your Ref:

Our Ref:

5th August 1998

Mr Aaron Mwale
Department of Paediatrics and Child Health
School of Medicine
UNZA

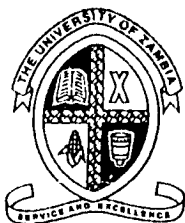
Dear Mr Mwale

I am pleased to inform you that the 34th meeting of the Board of Graduate Studies of 31st July, 1998 approved your research proposal entitled, *"The Appropriate Use of Hospital Beds in an Overburdened Teaching Hospital in a Developing Country: A Case Study of the University Teaching Hospital, Lusaka, Zambia."*

You can now proceed to Part II of your programme.

CONGRATULATIONS


Geoffrey Lungwangwa (Dr)
DIRECTOR



The University of Zambia

DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

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E-mail DirectorPostgrad@postgrad.unza.zm

P O Box 32379
Lusaka Zambia

Your Ref:
Our Ref:

9th March 1999

Mr Aaron Mwale
C/o Department of Community Medicine
School of Medicine
UNZA

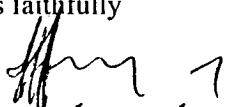
Dear Mr Mwale

re: **MPH DISSERTATION RESULTS**

I am writing on behalf of the Board of Graduate Studies to inform you that the examination results of your dissertation entitled "Appropriate Use of Hospital Beds in an Overburdened Teaching Hospital in a Developing Country: A Case Study of the University Teaching Hospital (UTH), Lusaka, Zambia" were discussed at the 37th meeting of the Board held on 8th March 1999.

Your dissertation was awarded an **OUTRIGHT PASS. CONGRATULATIONS!** You will be recommended to Senate for the award of the Master of Public Health degree after you forward four bound copies of your dissertation to this office.

Yours faithfully


GEOFFREY LUNGWANGWA (PH.D)
DIRECTOR

cc Dean - School of Medicine
Assistant Dean (PG) - Medicine
Head - Department of Community Medicine