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OPERATIONAL COST OF THE OBSTETRICS UNIT OF THE JOB SHIMANKANA TABANE 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 Public Health in the field of Hospital Management

November, 2012

DECLARATION

I, Polaki Ephraim Mokatsane 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.

_____

Polaki Ephraim Mokatsane

13 November 2012

DEDICATION

This research is dedicated to the people of Bojanala district in North West. In particular, my wife Portia and children who supported me right through my studies. Dedication also goes to the department of health North West for the opportunity to conduct this research within one of their facilities.

ACKNOWLEDGEMENT

- My Supervisor Dr D. Basu
- The Head of Department of Health North West- Department of Health and Social Development for allowing me to conduct the investigation;

ABSTRACT

BACKGROUND**:** The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development goals (WHO, 2002). The Maternity unit of the Job Shimankana Tabane (JST) Hospital, situated in the Rustenburg city (regarded as the fastest growing city within South Africa) is burdened with increasing number of patients for the last few years with resultant increased resource utilisation. However, there is no systematic study done to describe this situation. The above mentioned scenario necessitates this study to assess the operational cost of the Obstetrics Unit in relation to caseload, profile of patients, and resource utilization.

AIM**:** To determine the operational costs within the Obstetrics Unit of the JST Hospital in terms of caseload, profile of patients, and resource utilization

METHODOLOGY**:** Cross sectional study design was used for this study. Retrospective record review was done and information extracted from various sources of hospital information system. No primary data was collected for this study. Setting of this study was the Obstetrics unit at Job Shimankana Tabane Hospital situated within Rustenburg city of Bojanala District in North West Province. Data was collected on various variables that are relevant to the function of women health services and resource utilization in Obstetrics unit of this Hospital.

Results: Obstetric unit of Job Shimankana hospital experienced high caseload due to patient bypassing primary health care service points including district hospitals with highest number being seen afterhours; and due to inappropriate referrals from clinics. Analysis of profile of these patients showed 93% being Africans, 90% unemployed; and 70% being single. Hospital obstetric unit operational costs amount to just over R1.3 million with 57% accounted for by goods and services and human resource accounting for the remaining 43%. The average was R7, 717.75, which is very high.

Conclusion: The operational cost of this obstetric unit was found to be very high and quality may have been compromised due to increased caseload, leading to low length of stay.

TABLE OF CONTENT

DECLARATION ii

DEDICATION iii

ACKNOWLEDGEMENT iv

ABSTRACT v

TABLE OF CONTENT vi

LIST OF FIGURES ix

LIST OF TABLES x

GLOSSARY OF TERMS xi

LIST OF ABBREVIATIONS xii

CHAPTER 1 1

INTRODUCTION 1

1.1 BACKGROUND INFORMATION 1

1.2 JUSTIFICATION FOR THE STUDY 1

1.3 RESEARCH QUESTION 2

1.4 STUDY OBJECTIVES 2

1.4.1 BROAD OBJECTIVE 2

1.4.2 SPECIFIC OBJECTIVES 2

1.5 SUBSEQUENT CHAPTERS 3

CHAPTER 2 4

LITERATURE REVIEW 4

2.1 MATERNAL HEALTH SERVICES 4

2.2 MATERNAL MORBIDITY AND MORTALITY AS DETERMINANT OF HEALTH OUTCOMES 5

2.3 MEASURING MATERNITY HEALTH SERVICES 7

2.4 RESOURCE UTILISATION AND ITS IMPACT ON MATERNITY HEALTH SERVICES 8

2.5 THE ECONOMICS OF THE MATERNITY SERVICES 9

CHAPTER 3 12

METHODOLOGY 12

3.1 STUDY DESIGN 12

3.2 STUDY SETTING 12
3.3 STUDY POPULATION 13
3.4 SAMPLE 13
3.5 DATA MANAGEMENT 14
3.5.1 VARIABLES 14
3.5.2 STUDY INSTRUMENT 16
3.5.3 DATA COLLECTION 16
3.5.4 DATA ANALYSIS 17
3.5.5 PILOT STUDY 17
3.5.6 ETHICAL CONSIDERATIONS 17
CHAPTER 4 19
RESULTS 19
4.1 THE CASELOAD OF PATIENTS ATTENDING OBSTETRICS UNIT 19
4.2 THE PROFILE OF PATIENTS 20
4.2.1 AGE 20
4.2.2 ETHNICITY 21
4.2.3 MARITAL STATUS 21
4.2.4 EMPLOYMENT STATUS 22
4.2.5 MEDICAL AID 22
4.2.6 PLACE OF RESIDENCE 23
4.2.7 MODE OF TRANSPORT 24
4.2.8 REFERRAL 24
4.2.9 OBSTETRIC PROFILE 25
4.3 THE RESOURCE UTILIZATION IN THE OBSTETRICS UNIT DURING THE STUDY PERIOD 27
4.3.1 HUMAN RESOURCES 27
4.3.2 PHARMACY 28
4.3.3 LABORATORY 29
4.3.4 BLOOD AND BLOOD PRODUCTS 30
4.3.5 RADIOLOGY 31
4.3.6 STORES 32
4.3.7 SUMMARY OF RESOURCES UTILIZATION 33

CHAPTER 5 3434
DISCUSSION 3434
5.1 INTRODUCTION 3434
5.2 DESCRIPTION OF THE CASELOAD OF PATIENTS ATTENDING OBSTETRICS UNIT 3434
5.3 DETERMINATION OF THE PROFILE OF PATIENTS ATTENDING OBSTETRICS UNIT DURING THE STUDY PERIOD 3535
5.4 DETERMINATION OF THE RESOURCE UTILIZATION IN THE OBSTETRICS UNIT DURING THE STUDY PERIOD 3737
CHAPTER 6 3838
CONCLUSIONS AND RECOMMENDATIONS 3838
6.1 CONCLUSIONS RELATED TO THE AIMS OF THE STUDY 3838
6.1.1 DESCRIPTION OF THE CASELOAD OF PATIENTS ATTENDING OBSTETRICS UNIT 3838
6.1.2 DETERMINATION OF THE PROFILE OF PATIENTS ATTENDING OBSTETRICS UNIT 3939
6.1.3 DETERMINATION OF THE RESOURCE UTILIZATION IN THE OBSTETRICS UNIT DURING THE STUDY PERIOD 3939
6.2 LIMITATIONS OF THE STUDY 4040
6.3 RECOMMENDATIONS 4040
6.3.1 FOLLOW UP 4040
6.3.2 FUTURE RESEARCH 4141
6.4 SUMMARY AND CONCLUSIONS 4141
REFERENCES 4242
APPENDICES 11
APPENDIX A: ETHICS CLEARANCE CERTIFICATE AND LETTERS OF PERMISSION 11
APPENDIX B: DATA COLLECTION TOOLS 11

LIST OF FIGURES

Figure 3.1 Bojanala District ..... 13~~13~~
Figure 4.1 Number of patients admitted ..... 20~~20~~
Figure 4.2 Distribution of Age ..... 21~~21~~
Figure 4.3 Length of stay ..... 27~~27~~

LIST OF TABLES

Table 3.1 Relevant objectives and study variables ..... 14~~15~~
Table 3.2 List of Instruments ..... 16~~16~~
Table 4.1 Case load ..... 19~~19~~
Table 4.2 Ethnicity ..... 21~~21~~
Table 4.3 Marital status of the subjects ..... 22~~22~~
Table 4.4 Employment status of the subjects ..... 22~~22~~
Table 4.5 Medical aid status of the subjects ..... 22~~22~~
Table 4.6 Place of residence ..... 23~~23~~
Table 4.7 Mode of transport ..... 24~~24~~
Table 4.8 Source of referral ..... 24~~24~~
Table 4.9 Parity of the subjects ..... 25~~25~~
Table 4.10 Booking status of the subjects ..... 25~~25~~
Table 4.11 Diagnosis on admission for antepartum patients ..... 26~~26~~
Table 4.12 Mode of delivery ..... 26~~26~~
Table 4.13 Human resources utilized during this period ..... 28~~28~~
Table 4.14 Pharmaceutical products used during this period ..... 29~~29~~
Table 4.15 Laboratory tests done during this period ..... 30~~30~~
Table 4.16 Blood and blood products used during this period ..... 31~~31~~
Table 4.17 Radiological investigations done during this period ..... 32~~32~~
Table 4.18 General Stores materials used during this period ..... 32~~32~~
Table 4.19 Summary of resources utilized during this period ..... 33~~33~~

GLOSSARY OF TERMS

District Hospital is the hospital that provide level one or primary health care services through general medical practitioners,

District Health system is government model that seeks to integrate health services through decentralization within district,

Health Sub-district is a small division which is demarcated by different municipal locality that forms part of the district

Inappropriate hospital admission: It can be defined as an admission that does not result in any significant benefit for the patient, or which results in benefit which could have been obtained at a lower level of care (Eriksen ,1999)

Levels of care (level 1, 2, 3) are different levels of hospital care with level one (primary) offering primary health care, followed by level two (secondary) which is specialist led and finally level three (tertiary is highly specialised clinical services which are complex and expensive.

Patient Days Equivalent: Patient Day Equivalent (PDE), where 1 in-patient day = 3 outpatient visits.

Regional Hospital is the hospital that provides specialist led level two services with at least two specialists per discipline.

Private patients are those patients who bring along the general practitioner or specialist's referral letter to state hospital.

LIST OF ABBREVIATIONS

NCSS	Computer program for statistical/data analysis created by Company called NCSS LLC
BANC	Basic Antenatal Care
CEO	Chief Executive Officer
CHC	Community Health Centre
DHIS	District Health Information System
EMRS	Emergency Medical Rescue Services
ESMOE	Essential Steps in Managing Obstetrics Emergencies
GP	General Practitioner
HOD	Head of the Department
JST	Job Shimankana Tabane Hospital
MMR	Maternity Mortality Rate
NCCEMD	National Committee for the Confidential Enquiries into Maternal Deaths
PAAB	Patient Administration and Billing System
PSG	Patient Safety Group
WHO	World Health Organization

CHAPTER 1
INTRODUCTION

The purpose of this study was to determine the operational costs within the Obstetrics Unit in a regional hospital in the North West Province in terms of caseload, profile of patients, and resource utilization. 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 BACKGROUND INFORMATION

The Job Shimankana Tabane (JST) Hospital is the only regional hospital within the Bojanala district in the North West Province. The Hospital rendered following specialist services: internal medicine, orthopaedics, surgery, obstetrics and gynaecology, emergency services, and allied support services (such as radiology, and pharmacy). In addition, the Hospital renders some primary health care services like family planning. The number of patients who visited the Hospital has increased over last few years due to rapid growth of the Rustenburg city. The problem is worse in the Obstetrics and Gynaecology Unit as this is the only public hospital in the District which offers service at this level. As a result of that, the hospital operates consistently operated at more than 100% bed occupancy rate for past two years in comparison to provincial norm of 85%..

1.2 JUSTIFICATION FOR THE STUDY

Record review indicate and increased number of maternity patients that visited JST Hospital Obstetric unit, leading to shortage of beds in the Unit and increasing mortality and morbidity. (Table 1.1).

It is anticipated that the over-crowding of the wards leads to over-expenditure at the Obstetrics Unit of the Hospital. However, no systematic study has been done to understand the impact of increase caseload on operational cost of the Unit. It is expected that this study would be able to address that gap in knowledge. The study will hopefully assist the Hospital with a better understanding of the impact of increased case load on the operation cost of the Unit.

1.3 RESEARCH QUESTION

What was the effect of case load on the operating costs of the Obstetrics unit of the JST Hospital?

1.4 STUDY OBJECTIVES

1.4.1 BROAD OBJECTIVE

To determine the operational costs within the Obstetrics Unit of the JST Hospital in terms of caseload, profile of patients, and resource utilization

1.4.2 SPECIFIC OBJECTIVES

1. To describe the caseload of patients attending Obstetrics Unit during 2008/2009 financial year
2. To determine the profile of patients attending Obstetrics Unit during the study period
3. To determine the resource utilization in the Obstetrics Unit during the study period.

1.5 SUBSEQUENT CHAPTERS

So far, the background to the research has been discussed. Then, 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 operational costs within Hospital Obstetrics Units in terms of caseload, profile of patients, and resource utilization.

Chapter Three: Research Methodology: This 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 the operational costs within a Hospital Obstetrics Unit in a regional hospital setting.

CHAPTER 2
LITERATURE REVIEW

In this chapter, relevant literatures into operational costs within a Hospital Obstetrics Unit in terms of caseload, profile of patients, and resource utilization with particular reference to public hospitals are discussed. In addition to published literature, information from various unpublished sources is also reviewed.

2.1 MATERNAL HEALTH SERVICES

The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development goals (WHO, 2002). In South Africa, women's health services has been identified as one of the critical focus area that has been elevated and monitored by the National Health Department, through various initiatives such as saving mothers programme (NCCEMD, 2008; Department of Health, 2010). In South Africa, the majority of women's health and maternity services form a part of primary health care and district health system, whereas the other levels of services look after the complicated cases (Blaauw and Penn-Kekana, 2010). However, most of the gynaecological services have been referred to the regional, tertiary and central hospitals.

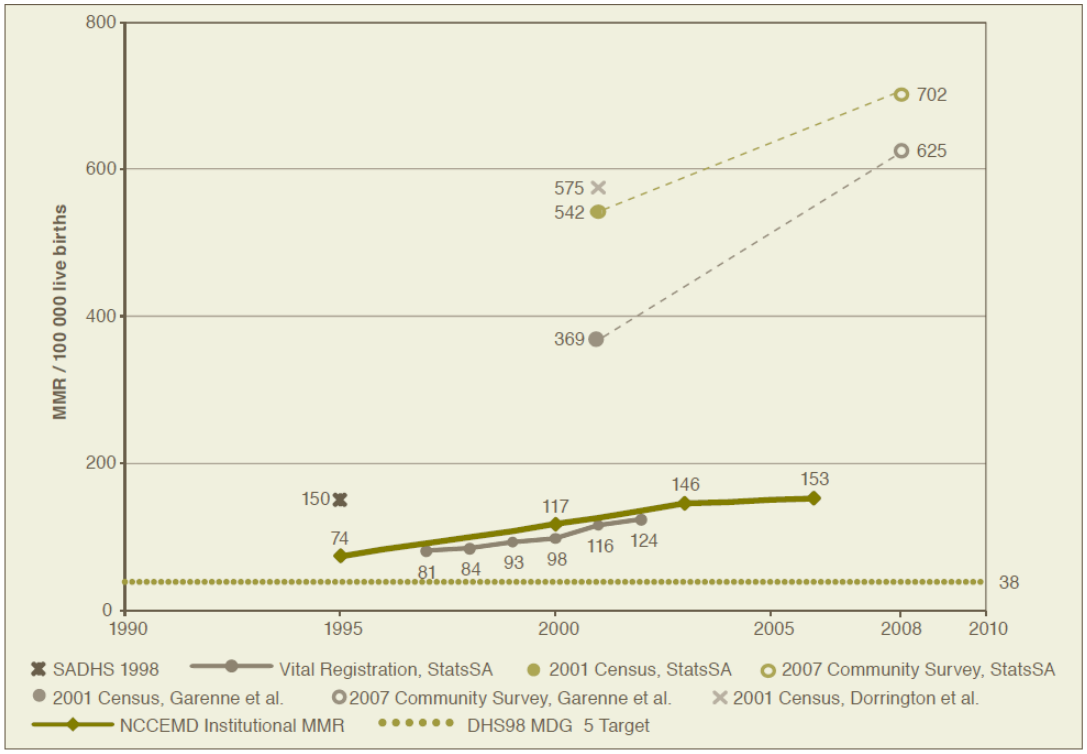
For many years, obstetricians measured the quality of their service by mortality statistics (such as maternal mortality in the middle of the twentieth century, and subsequently perinatal mortality). International comparison of clinical obstetric care relies heavily on Maternal Mortality Rate (MMR) data. For example, the MMR in parts of Africa is as high as 1000 per 100,000 live births. However, MMR cannot be a reliable indicator for maternity services in the perspective of hospital management and service delivery to patients. Therefore, other indicators should be developed to measure maternal health services. For example, workloads and resource utilization in maternity services is perceived to have an impact on clinical services. Although inappropriate admissions increase workload and resource utilization, they are not captured in clinical indicators such as MMR. Although MMR is an important impact

indicator, there is a need to use other indicators (input, process and output indicators) for measuring maternal health services.

2.2 MATERNAL MORBIDITY AND MORTALITY AS DETERMINANT OF HEALTH OUTCOMES

Notwithstanding decades of global and national efforts, child birth remains a high risk event for too many women and their newborn children in developing countries (Starrs, 2006). Minimizing maternal and newborn deaths in under-resourced countries is obviously a huge challenge. Pregnancy–related death remains the health indicator with the greatest disparity between the developed and developing countries (Ronsmans and Graham, 2006). To a large extent, the building blocks of a functioning health system, finances, and conveniently located primary health care facilities are present in South Africa. NCCEMD 92008) stated "*We need to build on this foundation and ensure proper implementation of financial protection, improved management of health facilities, and continued training of health personnel so that quality health care is provided*". However, this did not translate to reduction in maternal mortality in South Africa.

The most widely quoted figure for MMR in South Africa is still 150 per 100 000 live births, obtained from the 1998 South Africa Demographic and Health Survey (Department of Health, 1998). This estimate is thus now very out of date. However, it is the estimate closest to 1990 and therefore provides a baseline for MDG 5. A 75% reduction from 150 would equate to an MMR of 38 per 100 000 live births in 2015. Despite the questionable validity of the baseline, 38 deaths per 100 000 is now commonly cited as the MDG 5 target for South Africa. There is no comparable data on MMR available after that from SADHS done in 1998 (Blaauw and Penn-Kekana, 1998). Blaauw and Penn-Kekana, (1998) summarised most of the recent local MMR sources and estimates (Figure 2.1).



Source: Blaauw and Penn-Kekana, (1998)

Figure 2.1 MMR estimates in South Africa

The National Committee for Confidential Enquiry into Maternal Deaths (NCCEMD) produced four reports since its establishment by National Department of Health(NCCEMD, 2008). The report stated the top five causes of maternal mortality in the 2005-2007 triennium remained non-pregnancy-related infections (43.7%), mainly due to AIDS, hypertension (15.7%), obstetric haemorrhage (12.4%), pregnancy-related sepsis (9%) and pre-existing maternal disease (6%). The mortality rate of HIV-positive women was nearly ten times the rate of HIV-negative women, but preventable direct obstetric causes made up a significant proportion of deaths in both groups. Between a quarter and half of maternal deaths in national audits have an avoidable health-system factor contributing to these deaths. They had made important recommendations in these four reports which remained unchanged over the last decades (NCCEMD, 2008). Over the decades, the Department of health had taken multiple initiatives for improvement of maternal health based on these recommendations. But it has little impact on reduction of MMR probably due to

suboptimum implementation of high-impact interventions (Chopra, Daviaud, Pattinson, et al, 2009).

The NCCEMD (2008) reported that there was a significant increase in MMR at Level 2 hospitals (49% in 2002-2004; and 57% in 2005-2007), whereas there is decrease in MMR in Level 1 hospitals during the same period. Filippi, Ronsmans, Campbell, et al (2006) suggested adoption of health facility based adoption of a set of core strategy of intra-partum care to improve maternal health. Based on increasing MMR in Level 2 hospitals, there may be a need to develop hospital-specific strategy based on the identified factors of maternal death in that institution.

2.3 MEASURING MATERNITY HEALTH SERVICES

Measuring maternity health services in a hospital setting can include indicators such as hospital bed occupancy, length of stay, staff to patient ratio, and resource utilization (such as patient day equivalent). These indicators should be linked with the clinical indicators such as MMR for a comprehensive evaluation of maternity services.

Hospital beds represent a valuable resource in healthcare provision and their efficient use is an integral part of good hospital management. The pattern of bed occupancy is a common measure used to assess the efficiency of hospital bed management.

Bed occupancy rate reflects the relation between demand and supply (Moustafa and El Din, 2006). Achieving high efficiency in hospital bed operations is an important aim of hospital management. Fluctuations in hospital occupancy rates have important effects on hospital costs and efficient use of staff. Hospital bed occupancy rates have often been considered a measure of the efficiency of hospital operations because empty beds do not generate revenue while increasing hospital costs (Moustafa and El Din, 2006). However, it does not measure quality of care offered in a clinical unit.

2.4 RESOURCE UTILISATION AND ITS IMPACT ON MATERNITY HEALTH SERVICES

Resource utilization in obstetric services depends on various factors such as: (a) levels of care (b) appropriateness of admission (c) decision of clinicians. The most important determinant of resource utilization is bed occupancy, level of care and length of stay. In the majority of cases, both inappropriate admissions and the costs of hospital stays are the results of decisions made by clinicians, who are not directly responsible for managing expenditure of a hospital (Eriksen, Kristiansen, Nord, et al, 1999). For example, an unnecessary admission may expose patients to iatrogenic harm and thereby, waste resources (Jankowski , 1993).

Admission to the hospital is expensive and often causes a major disruption to a woman's life. It is extremely inefficient to admit patients simply to ensure that the appropriate investigations are organised and checked (Nicolaides, Soothill, Ajayi, et al, 2001).

A number of studies have been conducted around the area of admission rates and causes of both inappropriate and appropriate admissions. If variation in admission rates cannot be accounted for by differences in patient morbidity or by artefacts in data, then questions arise regarding equity of access to hospital care, appropriateness of hospital referrals and admissions, and effectiveness of primary care (Reid, Cook, and Majeed, 1999). Eriksen, et al (1999) suggested that an `inappropriate hospital admission' did not result in any significant benefit for the patient, or which resulted in benefit which could have been obtained at a lower level of care In addition, it increases caseload and increased resource utilization. O'Donnell (2000) suggested on the other hand that an ‘appropriate referral’ must also be necessary for the individual patient, timely in the course of the disease to provide efficient and effective clinical services.

In some instances, health facilities deny care to patients as cost saving measures. Eriksen, et al (1999) postulated that denial of care for inappropriate admissions in health facilities might save costs without sacrificing health benefits. However, the resultant impact of this deprivation may affect admission rates directly through increased morbidity, or indirectly through later presentation resulting in more acute symptoms requiring admission and increasing cost to treat complications linked to delayed admission (Reid et. al, 1999).

Other implications of inappropriate admissions and increase case load are mounting pressure on hospital beds and shortage of staff. Shortage of beds has resulted in hospitals having to arrange beds on the floor for patients to sleep (Irin, 2008). Even in developed countries like the USA, it was found that many Massachusetts hospitals, particularly academic medical centres, are so full during the week that patients can wait 10 or more hours for beds before getting a room and a regular bed (Irin, 2008).

Human theory predicts that errors occur more often when systems are stressed by constraining resources such as an overcrowded hospital. (Sprivulis, et al, 2006; Irin, 2008). In addition, it also resulted in poor patient satisfaction. For example, in the UK mothers are found to deliver on the NHS' conveyor belts system with beds being used for more than one birth a day in some maternity units. The experiences of childbirth for many women in these Units are blighted by lack of beds, showers and toilets (Hope, 2008). However no study has been done in South Africa to understand the impact of increasing case load on service delivery and operational cost of South African public hospitals. In view of that it is felt necessary to do systematic evaluation of the function of Obstetrics unit of this Hospital to measure its operational cost.

2.5 THE ECONOMICS OF THE MATERNITY SERVICES

The largest single source of health care costs is hospitals, which account for close to 40% of all health care expenditures. Maternity care is a significant user of resources in public hospital systems (Homer, et al, 2001). Economic analyses of maternity

services seem to have been a low priority. An economic analysis of maternity services in a hospital can provide valuable information regarding efficient utilisation of resources (Thompson and Fetter, 1963). It is assumed that every admission to the hospital is a random occurrence that is independent of every other admission. This eliminates scheduled admissions and waiting lists for nonemergency elective admissions. Twaddle and Young (1998) called for more research in this area, especially as scarce resources in public health care systems should be used efficiently.

In maternity units, operating costs are difficult to isolate as it is free in South Africa. However, operating costs of any units in a hospital can at least be inferred from available data that direct costs per day (Basu, Croce, Porazzi, et al, 2010).

In the absence of information related to operating cost, hospital managers, often employ simpler approach in planning bed capacity, relying primarily on target occupancy levels. Target occupancy levels, which may vary by clinical services within a given hospital, are assumed to reflect capacity levels that achieve an appropriate balance of costs and patient days (Green, 2002; Green, 2005).

The operating cost of a hospital is found to be influenced by (a) size of the hospital (bed capacity) as measured by its average daily census, (b) bed occupancy rate and (c) levels of care (Thompson and Fetter, 1963; Geller and Yochmowitz, 1975).

Interestingly, operating costs in maternity units are found to be proportionally higher for smaller hospitals. In addition, their ability to recover cost is also poor in comparison to bigger hospitals (Thompson and Fetter, 1963; Geller and Yochmowitz, 1975)

Thompson and Fetter (1963) found that the following factors influenced the bed occupancy rate: (a) size of institutions (smaller institutions tend to have a lower occupancy than the larger institutions) (b) the average length of stay and (c) the supply of beds relative to the demand. What is probably true is that hospitals are a

“mixed” system, responding in part to several random demands, and in part to some level of schedulable demand. Basu et al (2010) suggested that hospital managers should not only consider operating cost but also other factors such as number of patients, levels of patients, clinical outcomes, clinical governance, organisational efficiency, and organisational culture, which might play a significant influence on operational cost. They suggested a stepwise approach based on proper planning and a context analysis should be used for successful implementation of this type of activity in a public hospital setting.

In a study done in India, it was found average expenditure for normal vaginal delivery and caesarean delivery was US$ 370.70 and US$ 1,331.10 (Dhar, Nagpal, Sinha, et al, 2009). However, hospitals cannot always able to recover the operating costs from patients. For example, in India, average maternal care expenditure for a normal delivery at a public sector facility was INR 717 ($16) in the poorest decile which was higher than the average annual capacity to pay in the same decile, leading to almost 81% women from this decile giving birth at home (Bonu, Bhushan, Rani, et al, 2009). This resulted in higher maternal mortality and morbidity among the poorest quintiles (Filippi, et al, 2006).

As a result of that, many countries (such as South Africa) made maternal health services free (Republic of South Africa, 1994). However, free maternity services still imposes large out-of-pocket expenditures (such as travelling) on patients (Khan, 2005). A study done in North West Province found sub-optimal utilization of antenatal health services probably due to inefficient antenatal health services in the area (Pretorius and Greeff, 2004). Therefore, it is important to look at operational cost as a part of service improvement not for cost-minimization. Hopefully, this study would be able to combine the use of maternity services as well as link that with operational cost of the Unit.

CHAPTER 3
METHODOLOGY

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

3.1 STUDY DESIGN

This was a cross-sectional study based on retrospective record review.

3.2 STUDY SETTING

The setting of the study was the different sections of the Obstetrics Unit within the JST Hospital. This study was based on retrospective analysis of routinely collected data and no primary data were collected for this study.

BOJANALA DISTRICT

The Hospital is situated in the Bojanala District in the North West Province (Figure 3.1) and it is the only regional hospital in that District. The Hospital receives referral from four district hospitals in the Bojanala District.

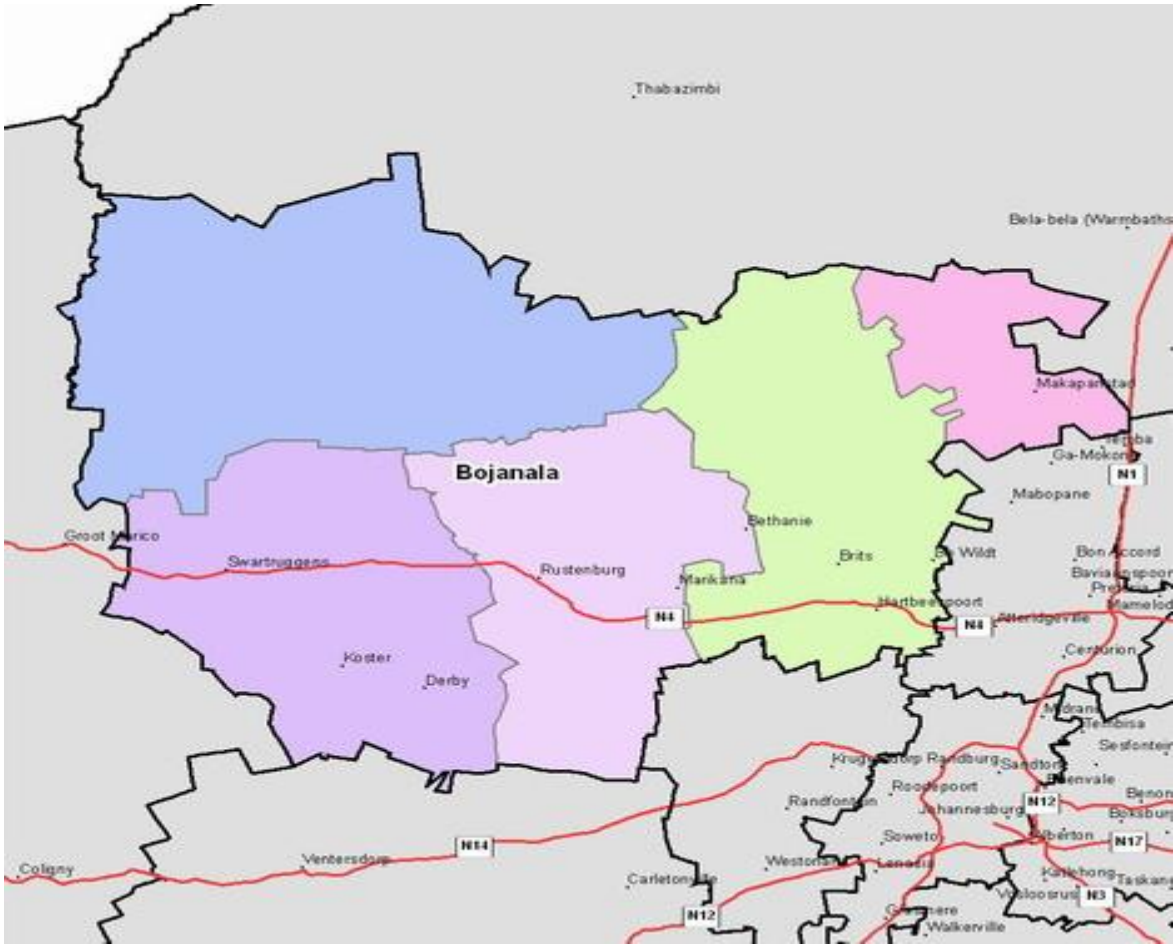


Figure 3.1 Bojanala District

3.3 STUDY POPULATION

The participants that were included in the study are

- Objectives 1 and 2: Records of patients who were admitted in the Obstetrics Unit during the period 2008/2009 (April 2008 to March 2009)
- Objective 3: (a) For material resources: Hospital records from Finance Department (National Health Laboratory Services, National Blood services, and consumables), Radiology Unit, and Pharmacy department during the study period. (b) For Human resources: Hospital records from the Human Resource Department for the staff worked at the Obstetrics Unit during the study period.

3.4 SAMPLE

A week was randomly sampled within 2008/2009 (which has no public holiday).

- Objectives 1 and 2: Records of all patients (n=179) who received service at Obstetrics Unit during that week were included.
- Objective 3: (a) Material resources: The hospital records of all goods and services (National Health Laboratory Services, National Blood services, consumables), Radiology Unit, Pharmacy department) were used to identify the items that were used during that week. (b) Human resources: Hospital records from Human resource department were used to identify staffs that worked during in the Obstetrics unit during the study period.

3.5 DATA MANAGEMENT

3.5.1 VARIABLES

Variables that were used with their indicators highlighting what will be measured with each variable for each objective are listed as Table 3.1 below:

Table 3.1 Relevant objectives and study variables

Objective	Variables	Indicators
Objective 1	Caseload	Total number of admitted patients Number of patients admitted per day
Objective 2	Patient profile	Age Ethnicity Gravidity Occupation (employed/ Unemployed) Medical aid/Income level Referral (GP/ Clinic/ CHC/ district hospital/ Self) Transport (Walking/ public/ private/ Ambulance) Arrival time (During or After working-hours) Length of stay Booking status (Booked/ unbooked) Diagnosis on admission Mode of delivery (Normal / Caesarean section)
Objective 3	Material resources	Number and costs of store items used Number and costs of blood and blood products used Number and costs of pharmaceutical items used Number and costs of laboratory tests performed Number and costs of radiological investigations performed
	Human resources	Number of staff per category Unit and total cost for salary

Information from NHLS, Blood bank, Pharmacy and Radiology unit were used to determine costs of laboratory tests, blood products, radiological investigations and pharmaceutical items respectively.

Pharmaceutical products and goods from Stores were counted at the beginning of the Study ($Stock_B$) and at the end of the study ($Stock_E$). In addition any Stock received during the study period was recorded ($Stock_{D\ (Mon- Sun)}$).

Total stocks used during the study period were calculated as:

$Stock_E - Stock_H + Stock_{D(Mon- Sun)}$

Human resource cost was calculated from the records of the Human resource Department and Obstetric Unit duty roster.

$$\text{Unit HR costs} = \frac{\text{Mid-point of Annual Salary of each category}}{52}$$

$$\text{Total HR Cost} = \sum \text{Weekly salary for each category of staff}$$

3.5.2 STUDY INSTRUMENT

Data Collection Tools that was used to collect data from different sources for each objective are listed in the Table 3.2. These MS Excel based tools were designed for this study to extract data from different sources mentioned above.

Table 3.2 List of Instruments

Objectives	Study Instruments	Source
1	Tool 1	DHIS/Maternity Register
2	Tool 2	PAAB printouts Discharge summaries
3	Tool 3	Financial Report Maximum and Minimum stock control sheets DHIS NHLS Blood bank Radiology Pharmacy
		Human resource Department records

3.5.3 DATA COLLECTION

Data for this study (case load and patient profile) are routinely collected as a part of its accreditation process with Council for Health Accreditation in Southern Africa (COHSASA) and National Department of Health's Office of Standard Compliance. Financial information is routinely collected for audit purpose. No primary data was collected specifically for this study. Data from various sources was extracted (Table 3.2).

3.5.4 DATA ANALYSIS

The data captured in the MS excel based data collection tools were analysed with NCSS statistical software (NCSS, 2007). Following descriptive statistics was reported:

- Continuous variables with normal distribution: mean and standard deviation
- Other continuous variables: median and inter-quartile range, and
- Nominal and ordinal variables: proportion and range.

3.5.5 PILOT STUDY

The study was piloted in one ward of the Medical Unit in the JST Hospital so as to assess the accuracy of the data instruments and also to ensure that, the researcher familiarizes himself with the tools to be used.

3.5.6 ETHICAL CONSIDERATIONS

Permission for conducting research and accessing documents was sought and received from the head of the department of the North West Provincial Department of Health. The study was also approved by the A submission was made to the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (M090560). Confidentiality and anonymity was maintained through usage of codes all the time for collection, capturing, and reporting of the information. Data collected and captured onto excel spreadsheet was saved on the external hard drive with

safety pin code encryption to ensure further confidentiality.

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CHAPTER 4
RESULTS

The results obtained from the analysis of data are described in this chapter.

4.1 THE CASELOAD OF PATIENTS ATTENDING OBSTETRICS UNIT

A total of 179 patients were seen and admitted into the Obstetric unit of this hospital during the study period (Table 4.1). The highest numbers of 33 patients were admitted on Sunday followed by 29 and 28 on Saturday and Monday respectively.

Table 4.1 Case load

Days	No. of patients admitted	Pregnancy		Working hours	
		Ante-partum	Intra-partum	During working Hours	After working Hours
Mon	28	14	14	17	11
Tue	23	7	16	10	13
Wed	21	13	08	9	12
Thu	19	0	19	11	8
Fri	26	10	16	6	20
Sat	29	3	26	5	24
Sun	33	7	26	15	18
TOTAL	**179**	**54**	**125**	**73**	**106**

The majority of patients were admitted after working-hours (106/179, 59%) (Figure 4.1). Working hours is defined as 7:00 to 16:00 hours from Monday to Friday (except public holidays.

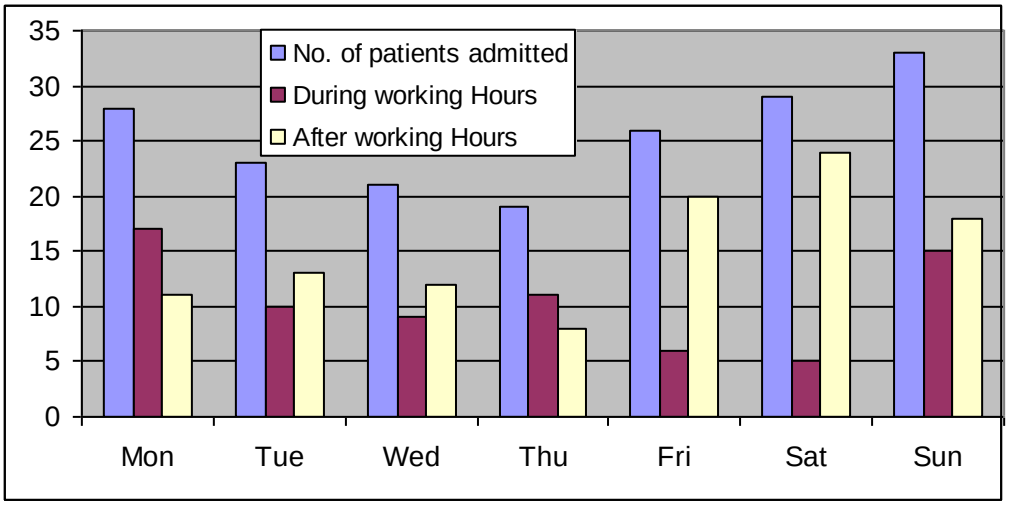

Figure 4.1 Number of patients admitted

Among the 179 patients, 125 patients were admitted for delivery (125/179, 69.8%), the rest of them (54/179, 30.2%) were admitted for ante-partum problems.

4.2 THE PROFILE OF PATIENTS

The following variables were measured: age, ethnicity, gravidity and parity, marital status, mode of delivery, diagnosis, referral and socioeconomic factors like occupation, mode of transport, place of residence, medical aid and Obstetric profiles. Their results are described below:

4.2.1 AGE

The mean age of the subjects was 28 years (± 8.3 years) (Figure 4.1). The minimum and maximum ages of the subjects were 15 years and 43 years respectively.

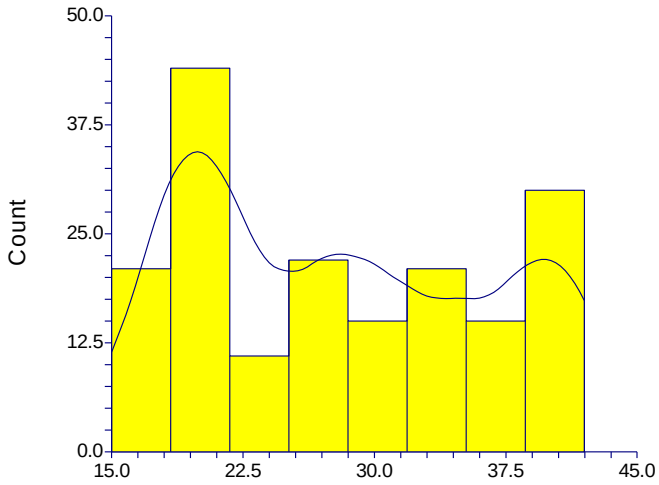

Figure 4.2 Distribution of Age

Six percent of the subjects were teenagers (less than 19 years of age).

4.2.2 ETHNICITY

The majority of the subjects (169, 93.9%) were Black (Table 4.2).

Table 4.2 Ethnicity

Ethnicity	**Percent**
Black	93.94%
Coloured	3.03%
White	3.03%
Total	**100%**

4.2.3 MARITAL STATUS

Marital status of the subjects is described in Table 4.3. The majority of the subjects were single (149, 69.7%).

Table 4.3 Marital status of the subjects

Marital status	Percent
Divorced	3.0
Married	27.3
Single	69.7
Total	**100%**

4.2.4 EMPLOYMENT STATUS

Employment status of the subjects is described in Table 4.4. The majority of the subjects were unemployed (164, 90.91%).

Table 4.4 Employment status of the subjects

Employment status	Percent
Employed	9.09
Unemployed	90.91
Total	**100%**

4.2.5 MEDICAL AID

Only 3% (5) subject had medical aid or insurance cover (Table 4.5)

Table 4.5 Medical aid status of the subjects

Medical aid	Percent
Yes	3.1
No	96.9
Total	**100%**

4.2.6 PLACE OF RESIDENCE

The place of residence of the subjects was described in Table 4.6. They come from various townships and villages across Bojanala District. Two third of them came from Rustenburg and Madibeng local municipality.

Table 4.6 Place of residence

Place of residence	**Percent %**
Rustenburg local Municipality	
Rustenburg	3.03
Bodorp	3.03
Phokeng	6.06
Sondela	6.06
Kanana	9.09
Tlhabane	9.09
Rustenburg local Municipality Total	36.4
Moses Kotane local Municipality	
Boitekong	18.18
Ledig	3.03
Mogwase	3.03
Moses Kotane local Municipality Total	24.2
Madibeng local Municipality	
Brits	6.06
Hartbeespoort Dam	3.03
Kroondal	15.15
Marikana	12.12
Madibeng local Municipality Total	36.3
Kgetleng local Municipality	
Swarttrugens	3.03
Kgetleng local Municipality Total	3
Grand Total	**100**

4.2.7 MODE OF TRANSPORT

The Table 4.7 listed the distribution of the subjects according to mode of transport. Seventy (42.4%) used private vehicles and sixty five (39.3%) used ambulances.

Table 4.7 Mode of transport

Mode of transport	Percent
Ambulance	39.4
Private	42.4
Walking	18.2
Total	**100%**

4.2.8 REFERRAL

The Table 4.8 listed the source of referral. The majority of the subjects were self-referred (85, 51.5%). Among the referred patients, the source of referral included community health centres (CHC), clinics, and general practitioners. Few patients were booked at this hospital.

Table 4.8 Source of referral

Referral	Percent
Community Health Centres	12.1
Clinics	18.2
General Practitioners	9.1
This hospital	9.1
Self	51.5
Total	**100%**

4.2.9 OBSTETRIC PROFILE

4.2.9.1 PARITY

The parity of the subjects was described in Table 4.9. Almost a third of the subjects (50, 30.3%) were primi para.

Table 4.9 Parity of the subjects

Parity	Percent
0	30.3
1	24.2
2	15.2
3	18.1
4	0
5	6.1
6	6.1
Total	**100%**

4.2.9.2 BOOKING STATUS

The booking status of the subjects was described in Table 4.10. A third of the subjects (60, 66.7%) were unbooked.

Table 4.10 Booking status of the subjects

Booking status	Percent
Booked	33.3
Unbooked	66.7
Total	**100%**

4.2.9.3 DIAGNOSIS

The diagnosis on admission for the antepartum subjects (n=54) is listed in the Table 4.11. A third of the antepartum subjects (33%) were admitted for pregnancy induced hypertension

Table 4.11 Diagnosis on admission for antepartum patients

Diagnosis on admission	Percent
Abruptio	42.4
CPD	6.1
Antepartum haemorrhage	3.0
Pregnancy induced hypertension	33.3
Latent labour	6.1
Rh-	9.1
Total	**100%**

One hundred and twenty five subjects were admitted for delivery.

4.2.9.4 MODE OF DELIVERY

The mode of delivery of the subjects is listed in the Table 4.12. The majority of the subjects (68, 54.5%) had delivered by caesarean section.

Table 4.12 Mode of delivery

Mode of delivery	Percent
Caesarean section	54.5
Normal delivery	45.5
Total	**100%**

4.2.9.5 LENGTH OF STAY (DAYS)

The median length of stay of the subjects was 3 days (Inter-quartile range 1 to 4

days) (Figure 4.3). The minimum and maximum numbers of days were 1 and 5 respectively.

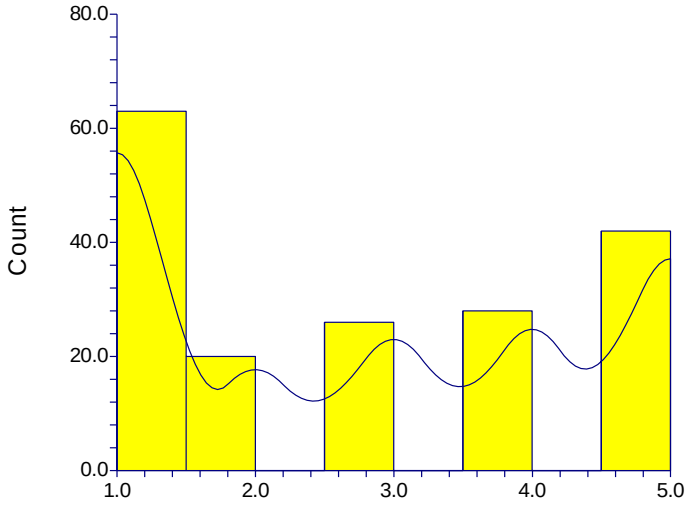

Figure 4.3 Length of stay

4.3 THE RESOURCE UTILIZATION IN THE OBSTETRICS UNIT DURING THE STUDY PERIOD

The resources utilized during this period in the Obstetrics Unit are described below:

4.3.1 HUMAN RESOURCES

The number of staff worked in the Maternity Unit during this period is described in Table 4.13.

Table 4.13 Human resources utilized during this period

Staff category	Number	Unit salary per week	Total salary per week
Medical			
Specialist: Principal	1.5	R 22,693	R 34,040
Specialist: Senior	1	R 16,570	R 16,570
Medical Officers			
Medical officer: Principal	2	R 16,818	R 33,636
Medical officer: Senior	2	R12,674	R 25,348
Medical Officer: community service	5	10 921.44	R 54,605
Medical Officer: Intern	5	10 137.87	R 50,685
Sub-total	**14**		**R 214,884**
Nurse			
Assistant manager	1	R 10,138	R 10,138
Operational manager	3	R 8,755.00	R 26,265
Nurse: Chief Professional	12	R 7,089	R 85,068
Nurse: Professional	30	R 5,936	R 178,080
Nurse: Staff	7	R 2,812	R 19,684
Nurse: Assistant	16	R 2,646	R 42,336
Sub-Total	**69**		R 361,571
Support			
Ward clerk	1	R 2,000	R 2,000
Cleaner	3	R 1,831	R 5,493
Sub-total	**4**		R 7,493
Total			**R 583,948**

Total human resource cost was R583,948 during the study period. Average human resource cost was R 3,262.36.

4.3.2 PHARMACY

The Pharmaceutical products used during this period in the Obstetrics unit are described in Table 4.14.

Table 4.14 Pharmaceutical products used during this period

Items	Total stock used	Unit price	Total price
Diclofenac Inj 25Mg/ml (Pack of 50 Vials)	35	R 28.95	R 1,013.25
Cefazolin Inj 500Mg (Single Vials)	104	R 2.50	R 260.00
Amphotericin-B Inj 50mg	260	R 23.79	R 6,185.40
Aminophylin Inj IV	328	R 10.20	R 3,345.60
Amoxycillin Clavulan Inj 1000	55	R 17.16	R 943.80
Cefuroxime Inj 750 Mg	67	R 5.90	R 395.30
Dextrose in Water Inj	177	R 14.62	R 2,587.74
Chlorhexidine/alcohol (Bottle of 500 Mls)	373	R 8.89	R 3,315.97
Test Strip Blood Glucose(Pack of 50 strips)	213	R 66.01	R 14,060.13
Hemocue Haemoglobin 201 (Pack of 200 Tests)	20	R 1,283.31	R 25,666.20
Hydrocortisone Sod.Succ.Inj	495	R 11.13	R 5,509.35
Metoclopramide Inj 5Mg/ml (Pack of 10 Vials)	16	R 8.51	R 136.16
Metronidazole 500g	120	R 7.48	R 897.60
Erythromycin IV Inj 1Gm	374	R 128.40	R 48,021.60
Ringers lactate	857	R 26.44	R 22,659.08
Nifedine Tabs slow rel (Pack of 28 tablets)	96	R 16.03	R 1,538.88
Oxytocin Inj (Pack of 10 Vials)	35	R 40.00	R 1,400.00
Magnesium Sulp Inj (Pack of 10 Vials)	384	R 10.43	R 4,005.12
Metronidazole Tabs 200Mg (Pack of 250 tablets)	19	R 11.08	R 210.52
GRAND TOTAL			**R 142,151.70**

Average cost per patient for pharmacy is R 794.10 (R 142,151.70/ 179).

4.3.3 LABORATORY

Laboratory tests done during this period for the patients admitted in the Obstetrics Unit is described in Table 4.15.

Table 4.15 Laboratory tests done during this period

Laboratory tests	Total number of tests	Unit price	Total price
ABO Group Rh	28	28.98	811.44
Full blood Count	157	R 48.3	R 7583.1
Albumin-A	16	R 33.51	R 536.16
Aspartate Transaminos	27	R 37.84	R 1,021.68
Alanine Transaminase	22	R 37.84	R 832.48
Reactive Protein	40	R 60.77	R 2,430.80
CD4 plg	51	R 63.60	R 3,243.6
Carbamazepine level	18	R 80.36	R 1,446.48
Disc sensitivity	20	R 57.98	R 1,159.60
Creatinine –Automated	94	R 25.87	R 2,431.78
Lactate Dehydrogenes	16	R 37.89	R 606.24
Phosphate Alkaline	21	R 36.06	R 757.26
Platelet Count-Manual	68	R 17.87	R 1,215.16
Profile Discrete Analysis	21	R 71.01	R 1,491.21
Uric Acid Automated	25	R 26.61	R 665.25
Urine Culture	127	R 45.63	R 5,795.01
Urine Microscopy	126	R 35.51	R 4,474.26
GRAND TOTAL			**R 36,501.51**

Total cost of R 36.501.51 was recorded during study period with full blood count accounting for 21% (R 7,583.10) of total laboratory cost. Average cost for laboratory test per patient was R 203.92

4.3.4 BLOOD AND BLOOD PRODUCTS

The Blood and blood products used during this period in the Obstetrics unit are described in Table 4.16.

Table 4.16 Blood and blood products used during this period

Service/Product	Units used	Unit price	Total price
Blood and blood products			
Red cell concentrate (in additive solution)	113	R1,128.77	R 127,551.01
Platelet concentrate- pooled	2	R 4,755.65	R 9,511.30
Fresh Frozen Plasma- Donor Retested	1	R 9,188.56	R 9,188.56
Platelet Concentration-single donor plasmapheresis	1	R6 542.03	R6 542.22
Other fees			
Emergency Round Trip Fee	4	R 863.38	R 3,453.52
Levy After hours	40	R 253.80	R 10,152
Levy: Emergency Cross-match	7	R 94.63	R 662.41
Perinatal: cord blood testing	1	R 118.13	R 118.13
Transfusion cross-match	6	R 502.27	R 3,013.66
Type and screen	3	R 224.90	R 674.70
Irradiation fee	2	R 242.11	R 484.22
Total	**178**		**R171 351.76**

Total cost of R171 351.76 was recorded during study period with red cell concentrate accounting for more than 50% of total blood test cost. Average cost for blood test per patient was R 957.27.

4.3.5 RADIOLOGY

Radiological investigations done during this period for the patients admitted in the Obstetrics Unit is described in Table 4.17. Only ultrasound examination (Abdominal and trans-vaginal) examinations were done. Every patient admitted in the Unit had one ultrasound examination on admission. In addition, a number of patients had more than one ultrasound examination during this period. A total of R 116,050.00 worth of abdominal ultrasounds was done during the study period. Average amount of cost per patient was R 648.32.

Table 4.17 Radiological investigations done during this period

Radiological investigations	Total	Unit price	Total price
Ultrasound (Abdominal and trans-vaginal)	211	R 550	**R116,050.00**

4.3.6 STORES

General Stores materials (goods) used during this period for the patients admitted in the Obstetrics Unit is described in Table 4.18.

Table 4.18 General Stores materials used during this period

cost driver	Total stock used	Unit price	Total price
Paper Towels(100pkt/box)	850	R 218.60	R 185,810.00
Soap (50g)	650	R 2.80	R 1,820.00
Plastic Bags(250 sheets):			R 0.00
280x305-32 mic clear	11.5	R 22.95	R 263.93
280x610-32 mic clear	7.5	R 71.97	R 539.78
280x 610-32 mic Red	27	R 91.80	R 2,478.60
Baby Milk(400g):			
Pre Nan	135	R 28.41	R 3,835.35
Nan Pelargon	62	R 20.17	R 1,250.54
Admin Set Adult	101	R 1.17	R 118.17
Pink 18GX1.5	200	R 7.53	R 1,506.00
Yellow 20gx1.5	85	R 7.23	R 614.55
Green 21GX1.5	110	R 11.65	R 1,281.50
Black 22GX1.25	41	R 11.31	R 463.71
Swabs Alcohol	341	R 9.50	R 3,239.50
Bandage Porous	434	R 8.00	R 3,472.00
Sanitary pads (36 p/pkt)	300	R 7.81	R 2,343.00
2 Ml Syringes	260	R 27.60	R 7,176.00
5 Ml Syringes	88	R 23.15	R 2,037.20
10 Ml Syringes	115	R 28.00	R 3,220.00
Gloves Pdr Free-7	55	R 126.00	R 6,930.00
Gloves Non Sterile -8	700	R 105.00	R 73,500.00
Gloves Exam Sterile- S	225	R 20.70	R 4,657.50
Gloves Exam Sterile- L	923	R 26.99	R 24,911.77
GRAND TOTAL			**R 331,469.09**

A total of R 331,469.09 worth of stores items were used during study period. Most expensive items in terms of total price were paper-towel (R 185,810.00) followed by gloves (R 109,640). Average cost per patient was R 1851.78.

4.3.7 SUMMARY OF RESOURCES UTILIZATION

Summary of resource utilized during this period is described below in Table 4.19.

Table 4.19 Summary of resources utilized during this period

Item	Total cost	Average cost
GOODS AND SERVICES		
Pharmacy	R 142,151.70	R 794.10
Laboratory	R36,501.51	R 203.92
Radiology	R116,050.00	R 648.32.
Bloods	171,351.76	R957.27
Stores	R 331,469.09	R 1851.78.
Sub-total: Goods and services	R797,524.06	R 4,455.39
HUMAN RESOURCES	R 583,948.00	R 3,262.36
TOTAL COST	**R 1,381,472.06**	**R7,717.75**

More than R 1, 3 million was spent during the study period with goods and services accounting for about 57% and staff costs at about 43%. Total average cost of all resource used during the study period is R7, 717.75.

CHAPTER 5
DISCUSSION

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

5.1 INTRODUCTION

Data that was collected and analysed from record review during the study period in line with the research objectives that were as follows; to describe the caseload, to determine profile of these patients, to determine resource utilization by looking at human resources, and goods and services. A random week was chosen and records of 179 patients who were admitted during the week were used for study purpose.

5.2 DESCRIPTION OF THE CASELOAD OF PATIENTS ATTENDING OBSTETRICS UNIT

Workloads and resource utilization in maternity services is perceived to have an impact on clinical services (Reid et al, 1999). The planning of a unit including allocation of resources should be linked to case loads of the unit. Inappropriate admissions increase workload and resource utilization but not captured in clinical indicators such as MMR.

A total of 8821 patients (average per week 170) were admitted in the Obstetrics Unit of the JST Hospital during the period 2008/2009 Obstetric unit. Therefore, the 179 patients included in the study is a fare reflection of the activities of the Unit. A total of 125 deliveries during the study period imply approximately 500 deliveries in a month which then becomes 6000 if annualized.

The majority of the patients were admitted after working hours. This picture suggests that, majority of patients avoids visiting the clinics, CHCs including hospital

outpatient clinic in favour of afterhours where only casualty department is the 1st contact of the system. This skewed picture has a serious impact on planning of human resource allocation, as fewer staff are on-duty during after-hours. Thompson and Fetter (1963) concluded that, the caseload of the maternity unit affects not only the investment costs but also the direct cost of operating that unit as well. Eriksen (1999) also suggested appropriateness of admission had a direct impact on resource utilization. Therefore, the Hospital should consider this picture while planning for allocation of resources in the Unit.

5.3 DETERMINATION OF THE PROFILE OF PATIENTS ATTENDING OBSTETRICS UNIT DURING THE STUDY PERIOD

The study looked at different variables like age, ethnicity, gravidity, etc, including socioeconomic factors like occupation.

The results indicated that, majority of these women were young, single, primipara and from poor socioeconomic status as they were unemployed, had not medical aid or insurance cover. This trend is similar within developing countries like South Africa and India, as demonstrated long ago by Thompson and Fetter, (1963). A large percentage of these women were young and single who were aptly described as 'lost generation'. In article published in Sunday times (January 2012), the teenage pregnancy was identified as one of the reasons for more than 1 million lost matriculants in the last 5 years. This also erodes gains and it weakens objectives of project like '*Take a girl child to school'* that endeavours to increase numbers of girl children registered within education system in South Africa.

The study found that the majority of these women were from villages and townships around Rustenburg with Boitekong had the highest proportion of patients followed by Kroondal mining area of Rustenburg. This pattern calls for investigations to identify reasons for these patients bypassing district hospitals in and around the above mentioned areas. For example, Boitekong is situated close to Moses Kotane Hospital as its district hospital drainage area. The Hospital has no recourse

regarding these issues in particular the referral system because there is no formal approved policy except drafts dating back 2006. In terms of geographical locations of these patients, the Kroondal side of Bojanala use this regional hospital as the first contact with health care services. The referral patterns as indicated by the results bring into question the efficiency of the surrounding CHCs and district hospitals. It also points to the fact that, the referral pattern within Bojanala district needs to be looked into, as majority of referrals were from clinics not community health centres.

The study found a large proportion of women had been transported by the private vehicles (42.4%) as opposed to ambulance. The majority of them were self-referred (51.5%) who were not booked with PHC clinics, and district hospitals, which is of concern. The patients should be encouraged appropriate levels of care nearer to their name and only come to this Hospital when referred through an institution. This would hopefully reduce self-referral. O'Donnell (2000) suggested that an appropriate referral must also be necessary for the individual patient, timely in the course of the disease to provide efficient and effective clinical services

The high rate of caesarean section (54.5%) at the institution above provincial norms (15%) is also of concern. The proportion of normal delivery depends on levels of care, geographical location, type of health facilities (such as public or private). For example, a primary health care facility in South Africa (Diepkloof Community Health Centre) reported 57% normal deliveries, 3% born before arrival and remaining 30% referral to Chris Hani Baragwanath Hospital for further management (Broomberg and Rees, 1993). The high rate of caesarean section might be due to the nature of patients managed at this Hospital (Regional Hospital) and would require further investigation. In addition, the Hospital has an unwritten policy of '*once a caesarean section delivery always a caesarean section'* which needs to be reviewed.

The median length of stay of the subjects was 3 days (Inter-quartile range 1 to 4 days). This is within provincial norms. However, within the same week of the study, two women were found sitting on the benches of the post natal ward because there were no beds for them. In the UK, Hope (2008) reported that mothers were found to

deliver on the NHS' conveyor belts system with beds being used for more than one birth a day in some maternity units. The experiences of childbirth for many women in these Units were blighted by lack of beds, showers and toilets. This implies there is an urgent need to review the allocation of the bed in the Unit, which is not aptly captured in the indicator based on ‘average length of stay’.

5.4 DETERMINATION OF THE RESOURCE UTILIZATION IN THE OBSTETRICS UNIT DURING THE STUDY PERIOD

According to National department of health policy on Patient Fees, maternity cases fall under free health care services. In the same token, the policy also allows charging of by-pass fees as a deterrent which will not apply for these categories of patients. However, it is important to develop an understanding of the resources utilized in these Units.

More than R 1,3 million was spent during the study period with goods and services for about 57% and staff costs at about 43%.

The stores items account for 52% of expenditure for goods and services. Mills, Kapamula and Chisimbi (1993) found in a study done in a Malawian district Hospital, pharmaceutical products and salary and wages account for 27% to 39%, whereas medical supplies (24-37%).

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 listed. Based on the findings of the study, appropriate recommendations and suggestions for future research are included.

6.1 CONCLUSIONS RELATED TO THE AIMS OF THE STUDY

This was a cross-sectional study that looked at broad issues pertaining to the operational costs within the Hospital Obstetrics Units in terms of caseload, profile of patients, and resource utilization.

6.1.1 DESCRIPTION OF THE CASELOAD OF PATIENTS ATTENDING OBSTETRICS UNIT

It is very clear that, this hospital obstetric unit case load is way too high in relation to the initial bed allocation. The hospital has seen a number that is almost the same as what is seen in the centres with bigger units in size than this obstetric unit. The number of patients seen resulted in women being exposed to risky situation whereby they had to stay less than two days in the hospital post operatively. This is put the clinicians and management in dilemma as there is constant shortage of beds resulting in reduced length of stay. Referral pattern that, illustrate referral patterns where clinics refer direct to a secondary hospital obstetric unit in this big numbers, result in increased case load which furthermore probably compromises quality.

The results indicating majority of patients being seen more after hours resulted in pressure on available skeletal staff for after hours. This situation is one of the factors that affected quality of this Obstetric unit as the three maternal deaths in 2008/2009 also occurred after hours. This caseload that is categorized as higher than what was planned for, is responsible for increased costs of operations of this obstetric units

that depletes the budget set for this hospital.

6.1.2 DETERMINATION OF THE PROFILE OF PATIENTS ATTENDING OBSTETRICS UNIT

Profile of the patients that were seen at this obstetric unit was women that are from disadvantaged or poor socioeconomic backgrounds. This is confirmed by the results that illustrated high percentage of this women being unemployed African women who didn't have access to medical aid or insurance cover and could not exercise the right of choice in terms of either going to public or private sector. Early adult age group accounts for the highest percentage of these women that were also single However, more than 16% of these women represents youth of Rustenburg which suggest that, family planning efforts from the department of health should focus on this group.

High rate of caesarean section can be attributed to the fact that, majority of these patients came as emergencies and also a large proportion of patients were diagnosed with both excessive bleeding and elevated blood pressure. The majority of these women were self referral creating challenge of planning and optimum treatment. A large proportion of them were transported through private cars which then question the efficiency of the emergency department services in the district.

6.1.3 DETERMINATION OF THE RESOURCE UTILIZATION IN THE OBSTETRICS UNIT DURING THE STUDY PERIOD

The total running cost of this hospital obstetric unit is in excess of a million rand per week. The Hospital obstetric unit runs at the cost that is almost the same to the tertiary hospital of Klerksdorp where there are more specialist obstetricians and gynaecologist and nurse specialist on duty. Furthermore, the Hospital case mix is not as complex as that of Klerksdorp Hospital. The question is, whether, the infrastructural design of this unit is also resulting in these high costs as the units are separately managed and staffed.

6.2 LIMITATIONS OF THE STUDY

The following limitations were experienced in conducting this study.

The major limitation will be as follows:

- Completeness of the records (objective 1)
- Seasonality as only one week of data will be used for objectives 2 and 3.
- Hidden cost for accommodation, medical gasses not included due to lack of reliable data

6.3 RECOMMENDATIONS

6.3.1 FOLLOW UP

The results will further be presented to the North West Department of Health with the view of presenting a model that can be used and rolled out in other disciplines of Job Shimankane Tabane Hospital and other hospitals with similar challenges. The study would like to make following recommendations based on the findings of the study:

- Draft Referral policy be adopted, approved and implemented with immediate effect to provide some regulatory mechanisms
- Increase facilities that implement Basic Antenatal Care package (BANC), Essential Steps in the Managing Obstetric Emergencies (ESMOE) strategies or strengthening thereof if already implemented.
- Revision of once a caesarean section delivery always a caesarean section policy practiced in the Hospital
- Outreach programme that includes specialists be initiated whereby, CHC and district hospitals are visited and supported.
- Targeted antenatal and postnatal health promotion campaigns where information is taken to the people on continuous basis.
- Primary Health Care services that includes Clinics, CHCs, District hospitals services packages to be reviewed and aligned according to capacity

- Establishment of a Joint obstetric management committee that comprises of all hospitals/clinics/CHC in Bojanala led by the Chief Director and Directors.
- Electronic Cost centre accounting system to be introduced to ensure availability and integrity of available data

6.3.2 FUTURE RESEARCH

Further research should be conducted to determine the cause of high caesarean section rate at the hospital. In addition, a qualitative study involving interview of patients should be conducted to understand the reasons for high self-referral.

6.4 SUMMARY AND CONCLUSIONS

Measuring quality of Obstetric units against the set government performance indicators as well as the contents of the investigation into maternal enquiry reports, conclusion drawn is that, quality was not where it should have been. The results from this study indicate the need for review of referral system within a district. The high cost of care at a regional hospital would require further investigation.

REFERENCES

Basu D, Croce D, Porazzi E, Restelli U, Naidoo S. 2010. Introduction of concept of cost centre management in a public hospital in South Africa. J Health Care Finance. 36(3):88-92.

Blaauw D, Penn-Kekana M. 2010. Maternal Health. In: Fonn S, Padarath A, editors. South African Health Review 2010. Durban: Health Systems Trust.

Broomberg J and Rees H. 1993. Delivering at the price-the cost of primary maternity care at the Diepkloof Community Health Centre, Soweto. S Afr Med J, 83(4):272-275. R 231.77

Bonu S, Bhushan I, Rani M, Anderson I. 2009. Incidence and correlates of 'catastrophic' maternal health care expenditure in India. Health Policy Plan 24 (6): 445-456.

Chopra M, Daviaud E, Pattinson R, Fonn S, Joy E Lawn JE. 2009. Health in South Africa 2: Saving the lives of South Africa's mothers, babies, and children: can the health system deliver? Lancet , 374: 835–46

Department of Health. 1998. South African Demographic and Health Survey. Pretoria: Department of Health.

Department of Health. 2010. Negotiated Service Delivery Agreement: A healthy life for all South Africans. Pretoria: Department of Health.

Dhar RSG, Nagpal J, Sinha S, Bhargava VL, Sachdeva A, Bhartia A. 2009. Direct Cost of Maternity-care Services in South Delhi: A Community Survey. J Health Popul Nutr, 27(3):368-378

Eriksen BO, Kristiansen IS, Nord E, Pape JF, Almdahl SM, Hensrud A, Jeger S. 1999. The cost of inappropriate admissions: a study of health benefits and resource utilization in a department of internal medicine. Journal of Internal Medicine, 246: 379-387.

Filippi V, Ronsmans C, Campbell OMR, Graham WJ, Mills A, Borghi J, Koblinsky M, Osrin D. 2006. Maternal Survival 5: Maternal health in poor countries: the broader context and a call for action. Lancet; 368: 1535–41

Geller NL and Yochmowitz MG. 1975. Regional planning of maternity services. Health Serv Res. 10(1): 63–75.

Green LV. 2002. How Many Hospital Beds? Inquiry 39(4): 400-412.

Green LV. 2005. Capacity Planning and Management in Hospitals. Operations Research and Health Care. International Series in Operations Research & Management Science, 70(Part 2): 15-41.

Hope J. Maternity units are 'conveyor belts' because of bed shortage. Mail Online. 2008. <http://www.dailymail.co.uk/health/article-1033897/Maternity-units-conveyor-belts-bed-shortage.html> [Accessed 20/04/2009]

Irin A. 2008 A major hospital in Botswana is struggling to cope with mounting pressure of staff and resources, the HIV/AIDS crisis and a high rate of road accidents. Mail & Guardian online. <http://www.mg.co.za/article/2004-09-23-major-botswana-hospital-faces-crisis> [Accessed 20/04/2009]

Jankowski R. 1993. What do hospital admission rates say about primary care? BMJ, 319: 67-68.

Khan SH. 2005. Free does not mean affordable: maternity patient expenditures in a public hospital in Bangladesh. Cost Eff Resour Alloc. 3: 1.
Mills AJ, Kapalamula J, Chisimbi S. 1993. The cost of the district hospital: a case study in Malawi. Bul of the World Health Org. 71(3/4): 329-339.

Moustafa M and El Din N. 2006. Bed Utilization Fluctuations at a University Hospital In Eastern Saudi Arabia and their Impact on Hospital Cost. The Journal of the Egyptian Public Health Association, 81(1&2): 43-52.

Nicolaides KH, Soothill PW, Ajayi R, Campbell S, Gibbs J, Chandran R, & Gibb D 2001. Effect of a fetal surveillance unit on admission of antenatal patients to hospital. BMJ, 303: 269-271.

O'Donnell CA. 2000. Variation in GP referral rates: what can we learn from the literature. Family practice, 17(6): 462-471.

Pretorius CF and Greeff, M. 2004. Health-service utilization by pregnant women in the greater Mafikeng-Mmabatho district. Curationis. 27(1):72-81.

Reid FAD, Cook DG, and Majeed A. 1999. Explaining variation in hospital admission rates between general practices: cross sectional study. BMJ, vol. 319, pp. 98-103.

Republic of South Africa. 1994. Free health services for pregnant women and children under the age of 6 years. Government Notice 657, Government Gazette 15817 of 1994. Pretoria: Government printer.

Ronsmans C, Graham WJ, Lancet Maternal Survival Series steering group. 2006. Maternal Survival 1: Maternal mortality: who, when, where, and why. Lancet. 368(9542):1189-200.

Sprivulis PC, Da Silva JA, Jacobs IG, Fraser ARL, Jelinek GA. 2006. Association between hospital overcrowding and mortality amongst patients admitted via Western

Australian emergency departments. MJA, 184(5): 208-212.

Starrs AM. 2006. Safe motherhood initiative: 20 years and counting. Lancet, 368(9542): 1130-1132.

.

Thompson JD and Fetter RB. 1963. The Economics of the Maternity Service. Yale J Biol Med. 36(1): 91–103.

APPENDICES

APPENDIX A: ETHICS CLEARANCE CERTIFICATE AND LETTERS OF PERMISSION

APPENDIX B: DATA COLLECTION TOOLS