

**COMPARISON OF MATERNAL AND NEONATAL
PROFILES AND OUTCOMES BETWEEN REFERRED
AND SELF-REFERRED PATIENTS DELIVERED AT
THE GANYESA DISTRICT HOSPITAL**

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the Witwatersrand, in partial fulfilment of the requirements for the degree of
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DECLARATION

I, Abigail Thumeka Mosedi, 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.

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March 2011

DEDICATION

This study was dedicated to the staff of the Ganyesa Hospital, the sub-district staff at large and the Dr Ruth Segomotsi Mopati District management team who can use the study as a baseline and a benchmark to measure the impact in other hospitals within the district.

ABSTRACT

BACKGROUND: Maternal health care in South Africa is based on the District Health System model which includes public health facilities (such as primary health care clinics, community health centers and district hospitals) as well as private health facilities. The majority of uncomplicated deliveries are expected to happen at community health centers and only complicated cases are expected to be referred to district hospitals. But in reality, the majority of deliveries in a health district happen in district hospitals. This often results in increasing utilisation of resources and decreased quality of care at these hospitals. The Ganyesa District Hospital, situated in Dr Ruth Segomotsi Mompati District in the North West Province has been facing similar challenges. Although the Hospital has been collecting routine information for the District Health Information System, it has never been analysed systematically to understand the impact of the current referral system on the performance of this Hospital.

Aims: To compare maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital during one year study period (1st April 2008 to 31st March 2009).

Methodology: The setting of this study was Ganyesa District Hospital, in the Dr Ruth Segomotsi Mompati District in the North West Province. A Cross sectional study design was used utilising retrospective data, from the Hospital information systems. The MS excel software based data extraction tool was designed to obtain data from Hospital Information System. The variables used for this study included socio-demographic and clinical profiles of patients. A comparative statistical analysis were done to compare the profile of two groups of patients: (Referred and Self-referred)

Results: The majority of the subjects were black. Most of the patients were, single and unemployed. The majority of the patients were multigravidae. The most common past and current medical disorders were diabetes and pregnancy induced hypertension (PIH). The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally (86.5%) followed by CS (13.2%). The majority of CSs were performed as

emergency. PIH and previous CS were common maternal indications whereas fetal distress and mal-presentation were common fetal indications. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications. There were 26 (4.3%) post-partum maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000).

The incidence of low birth weight (less than 2.5 kg) was 23%. The fresh and macerated stillbirths and low Apgar score were common neonatal complications.

The majority of the patients (374, 62.5%) arrived after-hours. The majority of the patients arrived by ambulance (87.3%). The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. The median distance between places of residence and the Hospital was 45 km.

There were no significant differences in socio-demographic (age, ethnicity, marital and employment status) and obstetric profiles (gravidity, prevalence of past medical disorders and antenatal disorders, prevalence of pre-term deliveries, mode of deliveries, intra-partum or post-partum complications and maternal outcomes.) between referred and self-referred patients. The two groups were not significantly different in terms of birth weight, the incidence of low birth weight, and Apgar scores (at 1 minute and 10 minutes) and neonatal complications.

More referred patients arrived after hours in comparison to self-referred patients. More referred patients arrived with ambulance in comparison to self-referred patients. The self-referred patients stayed closer to health facilities. This was probably the reason these patients decided to come to Hospital instead of going to their nearby PHC clinics.

Conclusion: Findings of this study will be reported to the district and provincial department of health and hopefully will be used for improvement of maternal health services in the Dr Ruth Segomotsi Mompati District.

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GLOSSARY OF TERMS

Apgar score: The Apgar score was devised in 1952 by Dr. Virginia Apgar as a simple and repeatable method to quickly and summarily assess the health of newborn children immediately after birth. The Apgar score is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10. Low Apgar score is defined as score below 6 (0-5).

District Hospital: A District Hospital provides three important roles within a district health system: (a) Provision of support to primary health care clinics and community services, in terms of clinical care and public health expertise (b) Provision of first level hospital care for the district and (c) Accepting the referral from clinics and/or community health centers, and be responsible for referring patients to secondary and/ or tertiary hospitals (Department of Health, 2002).

ICD-10 code: The ICD-10 code (International Classification of Diseases and related health problems - 10th revision) is a coding system developed by the World Health Organization (WHO), that standardizes the written description of medical and health information into codes in a standardized format (WHO, 2010).

Low birth weight: Low birth weight is defined as a weight of less than 2500 g (up to and including 2499 g), irrespective of gestational age.

Referral system: It can be defined as any process in which health care providers at lower levels of the health system, who lack the skills, the facilities, or both to manage a given clinical condition, seek the assistance of providers who are better equipped or specially trained to guide them in managing or to take over responsibility for a particular episode of a clinical condition in a patient (Department of Health, 2002).

Referred maternity patients: Patients who were referred from the primary health care clinics and community health centers during antepartum, intraparum or postpartum period based on provincial and national guidelines (Department of Health, 2007a).

Self-referred maternity patients: Patients who were not referred from the primary health care clinics and community health centers during their pregnancy based on provincial and national guidelines (Department of Health, 2007a).

LIST OF ABBREVIATIONS

ANC	Ante Natal Clinic
CHC	Community Health Centers
CS	Caesarean section
Dr. RSM	Dr Ruth Segomotsi Mompati District
IQR	Inter quartile range
MGD	Millennium Development Goals
PHC	Primary Health Care
PIH	Pregnancy Induced Hypertension
PNC	Postnatal Clinic
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to compare maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital. 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

All over the world, the district model is recommended as the preferred model for maternal healthcare delivery. The WHO recommends that there should be at least four facilities offering basic emergency care and one facility offering comprehensive emergency obstetric care within a health district of 500,000, the WHO recommends (WHO. 2009).

The South African Department of Health adopted a similar model. The community health centres (CHC) and fixed and mobile primary health care (PHC) facilities offer basic maternity care, whereas district and regional hospitals are expected to offer comprehensive maternity care (Figure 1.1). Pregnant patients are supposed to access antenatal services at their nearest clinics and, if a doctor's opinion is required, then patients can be referred to CHCs. Patients requiring normal deliveries are expected to be delivered at the CHCs (managed by professional nurses and midwives), whereas complicated cases are referred to either a district hospital (managed by generalist doctors) or a regional or tertiary hospital (managed by specialist doctors), if they require specialist intervention. Ideally, each health district should have a regional hospital whereas each health sub-district should have a district hospital and few CHCs where delivery should take place based on the nature of complexity (Department of Health, 2007a).

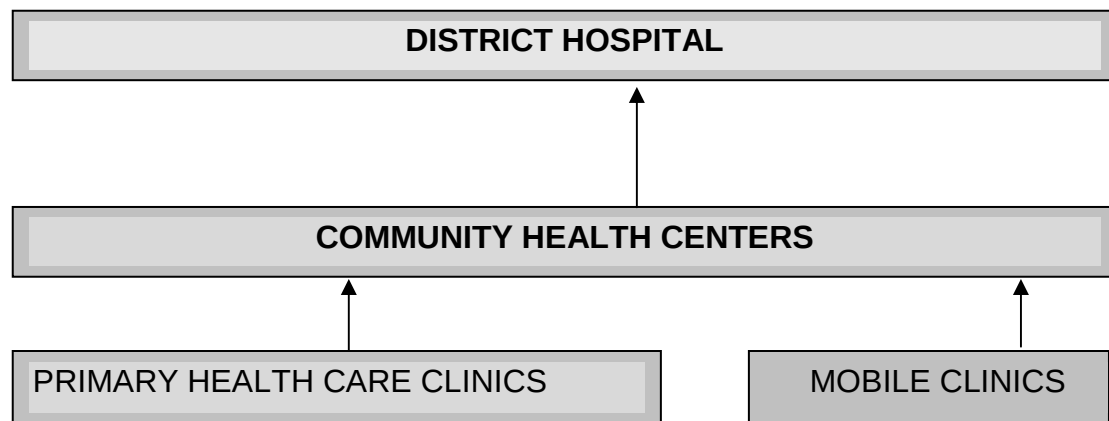


Figure 1.1 Referral network for the health sub-district

1.2 STATEMENT OF THE PROBLEM

The Ganyesa District Hospital is situated in the Dr Ruth Segomotsi Mompati District in the North West Province. Although the infrastructure is poorly developed in this rural district, the public health services are fully functional including a maternity unit at the Hospital. There are five CHCs referring directly to the Hospital. In addition, there are peripheral fixed clinics referring to the CHCs and mobile stations providing outreach services to the farm areas and communities that have limited access to these clinics. Antenatal check-ups are routinely done at the PHC clinics and uncomplicated deliveries are expected to be performed at CHCs. Complicated cases that would require m attention by medical doctors are expected to be referred to the Ganyesa District Hospital (Department of Health, 2007a). The performance indicators for obstetrics services in the Hospital are listed in Table 1.1.

Table 1.1 Ganyesa Hospital indicators for obstetric services

	2006/07	2007/08	2008/09
Number of beds allocated	12	15	15
Total Admissions	672	784	820
Average length of stay (days)	5	4	4
Bed occupancy rate	72%	83%	87%
Number of normal deliveries	534	587	598
Caesarean section rate	24%	38%	34%
Number of fresh still births	18	23	9
Number of macerated still births	14	28	15
Number of maternal deaths	2	1	4
Number of neonatal deaths	32	51	24

The above figures show that the Hospital has an increasing number of admissions and bed occupancy rates, high caesarean section rates and significant numbers of maternal and neonatal deaths. This raises concerns about the maternity services offered in this Hospital.

1.3 JUSTIFICATION OF THIS STUDY

Maternal health care in South Africa is based on the District Health System model which includes public health facilities (such as primary health care clinics, community health centers and district hospitals) as well as private health facilities. The majority of uncomplicated deliveries are expected to happen at CHCs and only complicated cases are expected to be referred to district hospitals. But, the district statistics showed that the majority of deliveries in the Dr Ruth Segomotsi Mompati District happen in district hospitals such as the Ganyesa District Hospital. Although the referral system for maternity patients is well-developed in the District, the number of deliveries is steadily increasing (from 534 in 2006/7 to 675 in 2008/9) at this Hospital. The monthly indicators for the maternity unit in the Ganyesa District Hospital showed a high caesarean section rate (34% in 2008/9) (above the identified district target of 11%) and a high maternal mortality ratio (200 per 100 000 in 2008/9). However, there was no increase in annual resources allocated to the Hospital (finance, material and human resources) during the last three years. There is a perception that the increase in the number of deliveries and

decrease in quality of services (such as high caesarean section, neonatal mortality rate and maternal mortality rates) are due to an increasing number of self-referred patients who bypass the referral system and come straight to the Hospital. However, no formal study has been done to systematically evaluate the current situation and to develop a better understanding of the impact of the increasing number of maternity patients. This study analysed the routinely collected data in an attempt to improve maternity services within the Hospital and the District.

1.4 RESEARCH QUESTION

What are the differences in the maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital during the study period (1st April 2008 to 31st March 2009)?

1.5 STUDY OBJECTIVES

1.5.1 BROAD OBJECTIVE

To compare the pregnancy outcomes (maternal and neonatal profiles and outcomes) between referred and self-referred patients delivered at the Ganyesa District Hospital during the study period (1st April 2008 to 31st March 2009)

1.5.2 SPECIFIC OBJECTIVES

1. To determine the profile (Socio-demographic and clinical) of mothers (referred and self-referred) who delivered at the Maternity Unit during the study period
2. To determine referral status and associated factors (Geographical distance, reasons for referral, time of referral, transport)
3. To compare the profiles and outcomes between referred and self-referred mothers

1.6 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 are described below.

Chapter Two: Literature Review: The purpose of the literature review is to review pertinent literature and to discuss concepts related to the maternity services with particular reference to antenatal booking at district hospitals in South Africa and elsewhere.

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

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

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

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

CHAPTER 2

REVIEW OF LITERATURE

In this chapter, relevant literature into the maternal health services with particular reference to referral of pregnant mothers are discussed. In addition to published literature, information from various unpublished sources is also reviewed.

2.1 MATERNAL HEALTH SERVICES

Maternal and child health services have been identified as priority programs throughout the world. These programs are monitored in various countries through the Millennium Development Goals (MDGs). The member states of the World Health Organization (WHO) have made a commitment for achievement of the targets by 2015. The WHO is also using these priority programs to measure the level of development in health services of member countries (WHO, 2007). Although progress has been made in reducing maternal and child mortality, it appears unlikely that the target will be met by 2015 in many countries, particularly those from sub-Saharan Africa (UNO, 2008). South Africa has also adopted these goals as a priority and has developed indicators for monthly monitoring and evaluation in order to improve maternal and child health services.

More than a decade after the introduction of democracy in 1994, South Africa has one of the most progressive and comprehensive reproductive health policies and laws in the world but this has not translated to improvement of maternal health services in the country (Cooper, Morroni, Orner, et al., 2004).

In the South African context, the concept of the MDGs has been adopted at national and provincial levels, and interventions were developed in line with improving child and maternal health services in order to reduce perinatal and maternal mortality. The WHO Guidelines for saving mothers have been

developed to be followed by all institutions offering maternal health services. The report indicated that 38.4% of the deaths were due to avoidable factors, including poor transport, lack of health facilities, and lack of appropriately trained staff (Department of Health, 2007b) which were similar to the previous reports (Department of Health, 1999). This shows that there has been very little progress in South Africa regarding improvement of maternal and child health services in terms of improvement of administrative factors which might be able to reduce maternal mortality and morbidity. Similarly, 'Saving babies report' identified factors associated with perinatal mortality and morbidity (Department of Health, 2008)

Tlebere, Jackson, Loveday, et al. (2007) suggested the following factors might have an impact on utilization of maternal health services in South Africa: (1) transport and distance to care, particularly in rural areas; (2) poor providers' communication with families. However, they found that health-seeking behaviour was better than anticipated.

2.2 MATERNAL REFERRAL SYSTEM

A well-functioning referral system is a necessary element of successful safe motherhood programmes in developing countries. It is an essential component of a district health system. A good maternal referral system provides essential access to emergency obstetric care and supports antenatal and delivery care in first line facilities such as PHC clinics and CHCs (Jahn and De Brouwere, 2001).

Murray and Pearson (2006) suggested 'a successful maternity referral system should include following: (a) a referral strategy based on the assessment of population needs and health system capabilities (b) a well resourced referral centre; (c) active collaboration among different levels of health facilities (d) formalised communication and transport arrangements among these facilities (e) specific protocols for referrer and receiver; (e) supervision and accountability for providers' performance; (f) affordable service costs; (g) the

capacity to monitor effectiveness; and (h) underpinning all of these, policy support'.

In South Africa, the district health system prescribes that all antenatal care patients except complicated cases (such as previous caesarean section, medical disorders in pregnancy) must be managed by professional nurses at primary health care clinics. When a patient's health problem cannot be managed at the clinic level, that patient may be referred to the community health centre normally visited or staffed with a permanent medical officer. A patient must only be referred to a district hospital when health problems can not be managed at this level (Couper and Hugo, 2007). The referral system in the Dr Ruth Segomotsi Mompati District is similar to the pattern elsewhere in South Africa. However, patients often bypass the clinics and CHCs and come straight to the Ganyesa District Hospital

Jahn, et al (2001) observed that the actual use of a referral system for obstetric care in developing countries was inversely related to the risk of complications. This implies that there is a large difference between the proportion of pregnant women being identified as "at risk" and those who actually attend referral level care. They found in referral hospitals, self-referral for delivery were often without specific medical reasons. This form of referrals (self-referrals) was the most common mode of referral, while institutional referral was less frequent and emergency referral was very rare. This pattern was found in a rural district Tanzania (Jahn and Kowalewski, 1998), a teaching hospital in Ghana (Nkyekeyer, 2000), as well as a rural district in Nepal (Jahn, Dar Lang, Shah, et al, 2000). For example, Jan et al (1998), reported in a rural district in Tanzania, self-referrals constitute more than 70%, institutional referral around 30% and emergency referral less than 5% of women at referral level. Nkyekeyer (2000) found 82% self referrals and 2% emergencies among hospital deliveries in a teaching hospital in Ghana.

The following factors have been identified that might have an influence on referral systems (Jahn, et al, 2001): (a) distance, (b) cost, (c) perceived quality of obstetric care, (d) health workers attitude and (e) respect for women's

social needs, (f) perceived aetiology of complications and socio-cultural preferences. It is not known if these factors also influence the maternal referral system in South Africa. More research is required to determine how maternity referral system can be improved so that the majority of the women deliver at the CHCs.

2.3 IMPACT OF REFERRAL SYSTEM ON RESOURCE UTILIZATION

Resource utilization is one of the major decisions to be taken by the hospital executives to ensure appropriate expenditure and proper use of resources. There are several indicators that can be utilized in an obstetric unit to measure effective use of resources. Efficiency indicators, such as the length of stay, are the measures that can be used to determine whether resources are used effectively (Eriksen, Kristiansen, Nord, et al., 1999). Inappropriate admissions often contribute to inappropriate use of resources, resulting in unplanned expenditure in hospitals. This resulted in limited benefits for appropriate patients of these institutions. (Jankowski, 1993). The Ganyesa District Hospital is a level one hospital that provides the core package of level one service. It is supposed to receive referred patients from the CHCs but this is often flouted because of self-referrals and the departmental policies of open access. This results in increased costs for medications and other supplies that could be avoided. It is therefore important that the referral system should be well-coordinated and implemented in line with the agreed upon provincial and national criteria (Department of Health, 2007a).

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 a retrospective record review conducted at a district hospital in the North West Province.

3.2 STUDY SETTING

The study setting was the Obstetric unit of the Ganyesa District Hospital, situated in the Dr. Ruth Segomotsi Mompati District in the southern part of the North West Province.

Dr. Ruth Segomotsi Mompati District

Dr. Ruth Segomotsi Mompati District (formerly Bophirima District Municipality) is one of the four districts of North West province of South Africa. The seat of Mompati District is Vryburg. The majority of its 439,637 people speak Setswana (2001 Census). More than 50% of the population (229,254, 52.15%) is female. Majority of them are black (405,675, 92%). Approximately third of the population (32%) is in the reproductive age group (15 to 45 years of age).

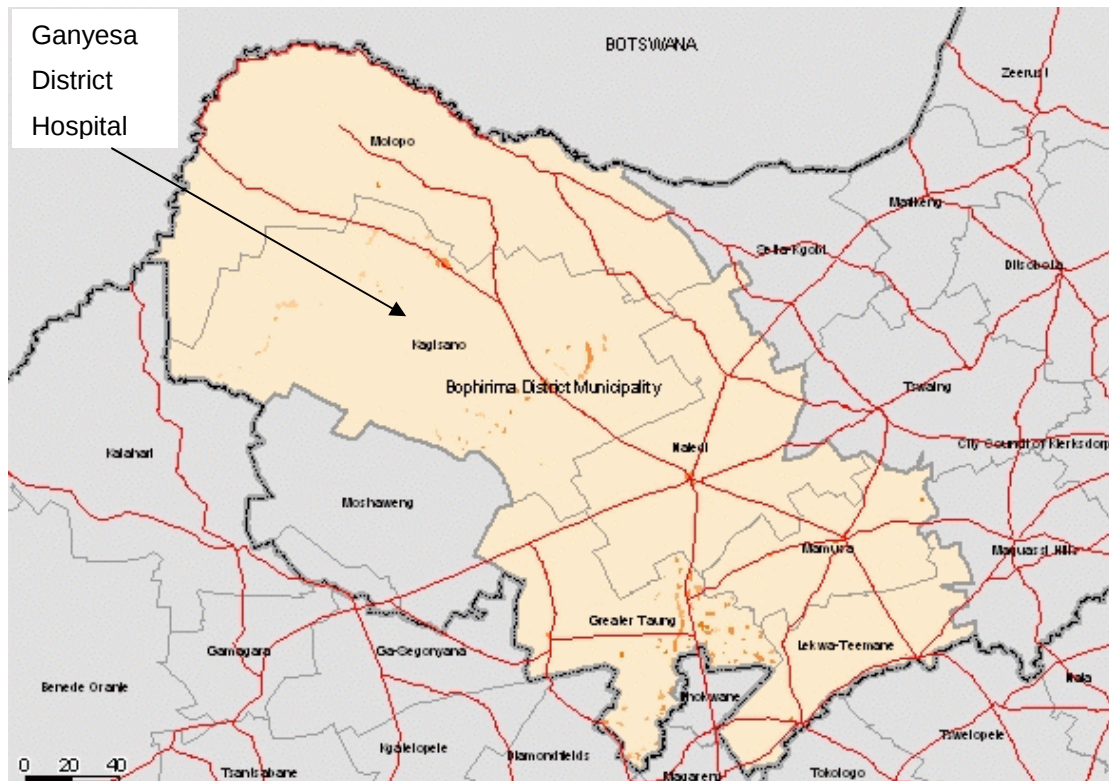


Figure 3.1 Dr. Ruth Segomotsi Mompoti District

There are five sub-districts within the District: Greater Taung, Kagisano, Naledi, Mamusa, Lekwa-Teemane and Molopo. Each of the five sub-districts in the District has a district hospital, few community health centers (CHC) and a number of primary health care (PHC) clinics. Mobile clinics are used to access the farm areas and those villages without fixed clinics. There is no regional hospital in the District.

Ganyesa District Hospital

Ganyesa District Hospital is situated at Ganyesa in the Kagisano Health sub-District. The Hospital is a 60-bed institution with 15 beds allocated for obstetric services. The activities of the unit include antenatal care, delivery (including assisted delivery and caesarean section) and postnatal care. There are six midwives and six auxiliary nurses and one doctor working in the Unit.

3.3 STUDY SCOPE

This study involved retrospective records review of routinely collected data from the Hospital Information System. No primary data collection was done for this study. No intervention was done as a part of this study.

3.4 STUDY PERIOD

The study period was one year from 1st April 2008 to 31st March 2009.

3.5 STUDY POPULATION AND SAMPLING

The study population comprised all the patients who delivered at the Maternity Unit of the Hospital during the study period. The entire study population was included in the study. Therefore, no sampling was done.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data were extracted from the Hospital Information System which records detailed information about the profiles and outcomes of patients who deliver at the Ganyesa District Hospital. Besides the Hospital Information System, the Maternity Unit also keeps manual records of patients admitted and delivered in the Unit.

3.6.2 STUDY INSTRUMENT

The data used for this study were extracted from the Hospital Information System to MS Excel using the tools designed for this study (Appendix B).

3.6.3 VARIABLES

Variables used in this study are listed below.

- Demographic characteristics (Age, Ethnicity, Marital status, Employment status, Occupation, Place of residence)
- Clinical: Maternal (Parity, Past medical history, Ante-partum diseases, Mode of delivery, Reasons for caesarean sections), and Neonatal (Birth weight, Apgar score) and Length of stay
- Referral (Source of referral, Geographical distance, Reasons for referral and time and transport)

The following new variables were created:

- Geographical distance- The nearest clinics were identified from the Dr. Ruth Segomotsi Mompati District office. Geographical distance between place of residence and (i) nearest PHC and (ii) Ganyesa District Hospital were calculated using the information available at the Dr. Ruth Segomotsi Mompati District office.
- Staff to patient ratio- The staff to patient ratio was calculated based on the ratio between the number of patients seen per month and the staff working during the period.

3.6.4 DATA ANALYSIS

The data was captured in the MS Excel based spreadsheets (Appendix B). Then data was then cleaned by looking at missing entry or any error. Subsequently, data was exported to NCSS software for analysis (NCSS, 2007).

The following descriptive statistics were reported:

- Continuous variables (not normally distributed): median and inter-quartile range, and
- Nominal and ordinal variables (such as ethnicity): proportions.

A comparative analysis was done between referred and self-referred patients using following statistical tests:

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

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

3.7 PILOT STUDY

No pilot study was done as the data to be used for this study is routinely collected.

3.8 ETHICAL CONSIDERATIONS

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

CHAPTER 4

RESULTS

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

4.1 STUDY POPULATION

The study population consisted of 599 patients who delivered at the Hospital during the study period. Four hundred forty nine (75%) of them were referred (Table 4.1). One hundred and forty nine (25%) patients presented themselves without being referred from any source.

Table 4.1 Referral source

Referral source	Total n (%)
Mobile clinic	2 (0.4%)
PHC clinic	31 (6.9%)
Community Health Centre	394 (87.8%)
Private practioners	22 (4.9%)
Total	450 (100%)

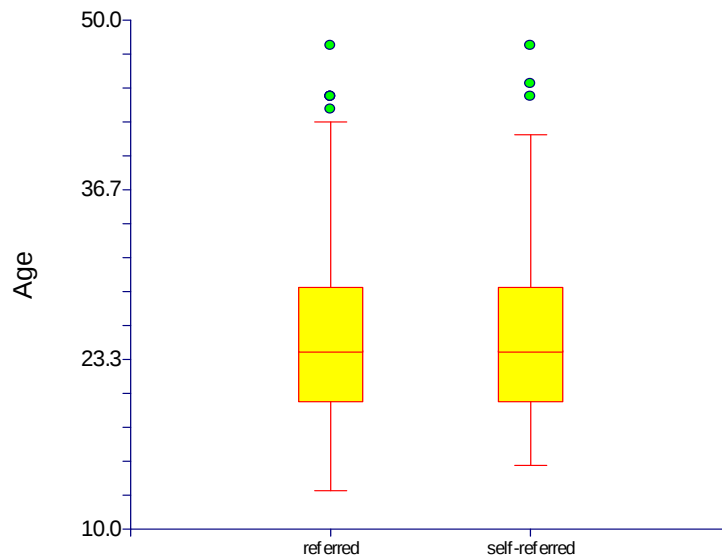
4.2 SOCIO-DEMOGRAPHIC PROFILES OF PATIENTS

4.2.1 AGE

The distribution of age of the subjects is presented in Table 4.2 (Figure 4.1). As age is not normally distributed, median and IQR were calculated. There were no significant differences in age between the referred and self-referred patients (Mann Whitney's U test, $p = 0.60$).

Table 4.2 Age distribution of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	24 (20-29)	24 (20-29)	24 (20-29)
Range	13 to 48	13 to 48	15 to 48

**Figure 4.1 Box-plot for age (in years)**

4.2.2 ETHNICITY

The ethnicity of the subjects is presented in Table 4.3. The majority of the subjects were black.

Table 4.3 Ethnicity of the subjects

	Total	Referred	Self-referred
Black	594 (99.3%)	445 (99.1%)	149 (100%)
Indian	2 (0.3%)	2 (0.4%)	0
Coloured	1 (0.2%)	1 (0.2%)	0
White	1 (0.2%)	1 (0.2%)	0
Total	598 (100%)	449 (100%)	149 (100%)

4.2.3 MARITAL STATUS

The marital status of the subjects is presented in Table 4.4. The majority of the subjects were single. There were no significant differences in marital status between the two groups (Chi-square test, $p = 0.58$).

Table 4.4 Marital status of the subjects

	Total	Referred	Self-referred
Married	49 (8.2%)	35 (7.8%)	14 (9.4%)
Divorced	6 (1%)	6 (1.3%)	0
Widow	7 (1.2%)	5 (1.1%)	2 (1.3%)
Single	515 (86.1%)	384 (85.9%)	129 (86.6%)
Minor	21 (3.5%)	17 (3.8%)	4 (2.7%)
Total	598 (100%)	449 (100%)	149 (100%)

4.2.4 EMPLOYMENT STATUS

The employment status of the subjects is presented in Table 4.5. The majority of the subjects were unemployed. There were no significant differences in employment status between the two groups (Chi-square test, $p = 0.87$).

Table 4.5 Employment status of the subjects

	Total	Referred	Self-referred
Employed	18 (3%)	14 (3.1%)	4 (2.7%)
Minor	21 (3.5%)	15 (3.3%)	6 (4%)
Student	5 (0.8%)	4 (0.9%)	1 (0.7%)
Unemployed	553 (92.6%)	415 (92.6%)	138 (92.6%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3 OBSTETRIC PROFILE OF PATIENTS

4.3.1 MATERNAL

4.3.1.1 GRAVIDITY

The distribution of gravidity of the subjects is presented in Table 4.6 (Figure 4.2). As gravidity is not normally distributed, median and IQR were calculated. There were no significant differences in gravidity between the referred and self-referred patients (Mann Whitney's U test, $p = 0.60$).

Table 4.6 Gravidity of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	2 (1-3)	2 (1-3)	2 (1-3)
Range	1 to 7	1 to 7	1 to 6
GRAVIDITY			
1	238 (39.9%)	179 (39.9%)	59 (39.9%)
2 to 5	353 (59.1%)	265 (59%)	88 59.5%
More than 5	6 (1%)	5 (1.1%)	1 (0.7%)

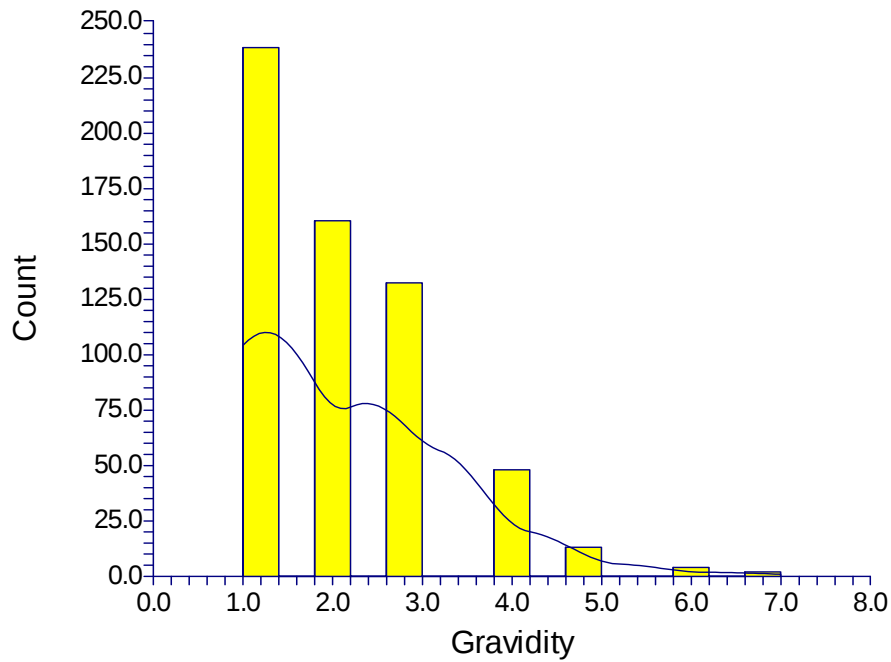


Figure 4.2 Gravidity of the subjects

4.3.1.2 PAST MEDICAL DISORDERS

The past medical disorders of the subjects are presented in Table 4.7. There were no significant differences in prevalence of past medical disorders between the referred and self-referred patients (Chi-square test, $p=0.11$).

Table 4.7 Past medical history of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
PTB	3 (0.5%)	1 (0.2%)	2 (1.3%)
Asthmatic	2 (0.3%)	1 (0.2%)	1 (0.7%)
Diabetic	16 (2.7%)	11 (2.4%)	5 (3.4%)
Hypertensive	2 (0.3%)	2 (0.4%)	0
Mental	9 (1.5%)	6 (1.3%)	3 (2%)
Renal	3 (0.5%)	1 (0.2%)	2 (1.3%)

4.3.1.3 ANTE-PARTUM DISEASES

The ante-partum disorders of the subjects are presented in Table 4.8. There were no significant differences in prevalence of ante-partum diseases between the referred and self-referred patients (Chi-square test, $p=0.08$).

Table 4.8 Past medical history of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
PIH	13 (2.2%)	11 (2.4%)	2 (1.3%)
Generalised oedema	2 (0.3%)	0	2 (1.3%)
Proteinuria	6 (1%)	5 (1.1%)	1 (0.7%)
Urinary Tract Infection	3 (0.5%)	1 (0.2%)	2 (1.3%)
Anaemia	2 (0.3%)	2 (0.4%)	0
Poor weight gain	6 (1%)	5 (1.1%)	1 (0.7%)
TB	1 (0.2%)	0	1 (0.7%)
Poly-hydramnios	7 (1.2%)	5 (1.1%)	2 (1.3%)

4.3.1.4 TERM AND PRE-TERM DELIVERY

The prevalence of pre-term deliveries of the subjects is presented in Table 4.9. There were no significant differences in prevalence of pre-term deliveries between the two groups (Chi-square test, $p = 0.65$).

Table 4.9 Pre-term deliveries among the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Pre-tem	89 (14.8%)	68 (15.1%)	20 (13.6%)
Term	509 (85.2%)	381 (84.9%)	129 (86.4%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3.1.5 MODE OF DELIVERY

The mode of deliveries of the subjects is presented in Table 4.10. There were no significant differences in terms of mode of deliveries between the two groups (Chi-square test, $p = 0.23$).

Table 4.10 Pre-term deliveries among the subjects

	Total	Referred	Self-referred
Normal vaginal delivery	517 (86.5%)	394 (87.8%)	123 (82.6%)
Caesarean section	79 (13.2%)	54 (12%)	25 (16.8%)
Vacuum	2 (0.3%)	1 (0.2%)	1 (0.7%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3.1.6 CAESAREAN SECTION

The study found no significant association between types of CS and referral (Chi-square test, $p = 0.42$) (Table 4.11).

Table 4.11 Type of caesarean section

	Total	Referred	Self-referred
Elective	23 (29.1%)	13 (25.9%)	9 (36%)
Emergency	56 (70.9%)	1 (74.1%)	16 (64%)
Total	79 (100%)	54 (100%)	25 (100%)

The indications for caesarean sections are presented in Table 4.12. There were no significant differences in terms of mode of deliveries between the two groups (Chi-square test, $p = 0.88$). The pregnancy induced hypertension (PIH) and previous CS were common maternal indications whereas fetal distress and mal-presentation were common fetal indications.

Table 4.12 Pre-term deliveries among the subjects

	Total	Referred	Self-referred
PIH	18 (22.8%)	13 (24.1%)	5 (20%)
APH	2 (2.5%)	1 (1.9%)	1 (4%)
PROM	1 (1.3%)	1 (1.9%)	0
CPD	3 (3.8%)	3 (5.6%)	0
Previous CS	9 (11.4%)	5 (9.3%)	4 (16%)
Prolonged 1st stage	1 (1.3%)	1 (1.9%)	0
Prolonged 2nd stage	4 (5.1%)	2 (3.7%)	2 (8%)
Mal-presentation	19 (24.1%)	13 (24.1%)	6 (24%)
Multiple pregnancy	3 (3.8%)	1 (1.9%)	2 (8%)
Fetal distress	19 (24.1%)	14 (25.9%)	5 (20%)
Total	79 (100%)	54 (100%)	25 (100%)

4.3.1.7 COMPLICATIONS AT DELIVERY

The intra-partum complications at delivery are described in Table 4.13. There were 41 (9%) complications among the referred patients in comparison to 10% among the self-referred patients. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications, There were no significant differences in terms of intra-partum complications between the two groups (Chi-square test, $p = 0.67$).

Table 4.13 Intra-partum complications among the subjects

	Total	Referred	Self-referred
Eclampsia	2 (3.5%)	2 (4.9%)	0
Intra-partum haemorrhage	10 (17.5%)	8 (19.5%)	2 (12.5%)
Precipitate labour	5 (8.8%)	4 (9.8%)	1 (6.3%)
Prolonged labour	17 (29.8%)	13 (31.7%)	4 (25%)
Offensive liquor	1 (1.8%)	1 (2.4%)	0
Fetal distress	6 (10.5%)	4 (9.8%)	2 (12.5%)
Fresh still birth	8 (14%)	5 (12.2%)	3 (18.8%)
Failure to diagnosis mal-presentation	2 (3.5%)	0	2 (12.5%)
cord prolapse	6 (10.5%)	4 (9.8%)	2 (12.5%)
Total	57 (100%)	41 (100%)	16 (100%)

4.3.1.8 POST-PARTUM COMPLICATIONS

The post-partum complications at delivery are described in Table 4.14. There were 21 (4.6%) post-partum complications among the referred patients in comparison to 3.3% among the self-referred patients. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were no significant differences in terms of intra-partum complications between the two groups (Chi-square test, $p = 0.20$).

Table 4.14 Intra-partum complications among the subjects

	Total	Referred	Self-referred
PIH	11 (42.3%)	10 (47.6%)	1 (20%)
PPH	7 (26.9%)	4 (19%)	3 (60%)
Postpartum anaemia	4 (15.4%)	4 (19%)	0
Gaping episiotomy	2 (7.7%)	1 (4.8%)	1 (20%)
Secondary suturing	2 (7.7%)	2 (9.5%)	0
Total	26 (100%)	21 (100%)	5 (100%)

4.3.1.9 MATERNAL OUTCOME

The maternal outcomes are described in Table 4.15. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/100,000) which is of concern. There were no significant differences in terms of maternal outcome between the two groups (Chi-square test, $p = 0.23$).

Table 4.15 Intra-partum complications among the subjects

	Total	Referred	Self-referred
Death	3 (0.5%)	3 (0.7%)	0
Discharged	586 (98.2%)	441 (98.2%)	145 (97.3%)
Referred to regional hospital	9 (1.5%)	5 (1.1%)	4 (2.7%)
Total	598 (100%)	449 (100%)	5 (100%)

4.3.2 PERINATAL

4.3.2.1 BIRTH WEIGHT

The distribution of birth weight of the subjects is presented in Table 4.16 (Figure 4.1). As birth weight is not normally distributed, median and IQR were calculated. There were no significant differences in birth weight between the referred and self-referred patients (Mann Whitney's U test, $p = 0.11$). The incidence of low birth weight (less than 2.5 kg) was 23% (105, 23% among referred and 38, 25% among self-referred patients).

Table 4.16 Birth weight of the subjects

Birth weight in kg	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	3 (2.6 – 3.4)	3 (2.6-3.4)	2 (2-3)
Range	1.4 to 3.9	1.4 to 3.9	1.4 to 3.8

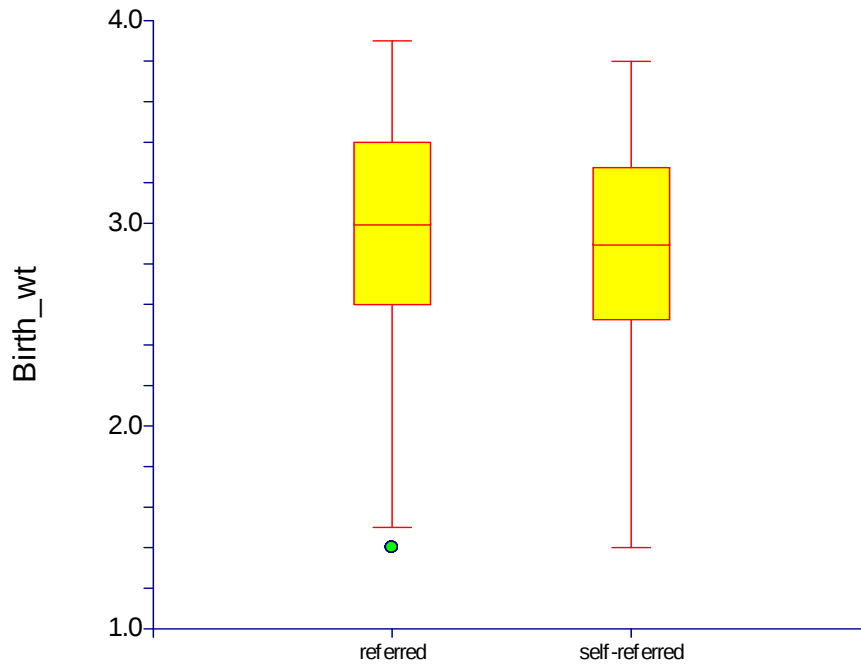


Figure 4.3 Box-plot for birth weight (in kg)

4.3.2.2 APGAR SCORE

The distribution of Apgar scores of the subjects is presented in Table 4.17. As Apgar score is not normally distributed, median and IQR were calculated. There were no significant differences in Apgar scores at 1 minute and 10 minutes between the referred and self-referred patients (Mann Whitney's U test, $p = 0.11$).

Table 4.17 Birth weight of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Apgar score- 1 minute			
Median (IQR)	8 (7-9)	8 (7-9)	8 (7-9)
Range	(0 to 10)	(0 to 10)	(0 to 10)
Apgar score- 10 minutes			
Median (IQR)	10 (9 -10)	10 (9 -10)	10 (9 -10)
Range	0 to 10	0 to 10	0 to 10

4.3.2.3 PERINATAL COMPLICATIONS

The perinatal complications are described in Table 4.18. There were 31 (6.9%) complications among the referred patients in comparison to 13 (8.7%) among the self-referred patients. The fresh and macerated stillbirths and low Apgar score were common neonatal complications. There were no significant differences in terms of neonatal complications between the two groups (Chi-square test, $p = 0.47$).

Table 4.18 Perinatal complications

	Total	Referred	Self-referred
Macerated still birth	11 (23.9%)	8 (23.5%)	3 (25%)
Fresh still birth	12 (26.1%)	10 (29.4%)	2 (16.7%)
Low Apgar score (1-5)	8 (17.4%)	8 (23.5%)	0
Abnormities	4 (8.7%)	2 (5.9%)	2 (16.7%)
Asphyxiated	2 (4.3%)	1 (2.9%)	1 (8.3%)
Aspirated	4 (8.7%)	3 (8.8%)	1 (8.3%)
Jaundice	1 (2.2%)	0	1 (8.3%)
Low birth weight (less than 1 kg)	1 (2.2%)	0	1 (8.3%)
Pyrexia	2 (4.3%)	2 (5.9%)	0
Swollen face	1 (2.2%)	0	1 (8.3%)
Total	44 (100%)	31 (100%)	13 (100%)

4.3.2.4 PERINATAL OUTCOMES

The perinatal outcomes are described in Table 4.19. There were no significant differences in terms of perinatal outcomes between the two groups (Chi-square test, $p = 0.20$).

Table 4.19 Perinatal outcomes

	Total	Referred	Self-referred
Macerated still birth	12 (1.8%)	10 (1.8%)	2 (2%)
Fresh still birth	11 (2%)	8 (2.2%)	3 (1.3%)
Neonatal death	9 (1.5%)	6 (1.3%)	3 (2%)
Discharged	566 (94.6%)	425 (94.7%)	141 (94.6%)
Total	598 (100%)	449 (100%)	149 (100%)

The perinatal mortality rate during this period was 53 per 1000 births.

4.3.3 LENGTH OF STAY (DAYS)

The distribution of length of stay of the subjects is presented in Table 4.20 (Figure 4.4). As length of stay is not normally distributed, median and IQR were calculated. There were no significant differences in length of stay between the referred and self-referred patients (Mann Whitney's U test, $p = 0.40$).

Table 4.20 Length of stay (in days)

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	2 (2-3)	2 (2-3)	2 (2-3)
Range	1 to 14	1 to 14	1 to 8

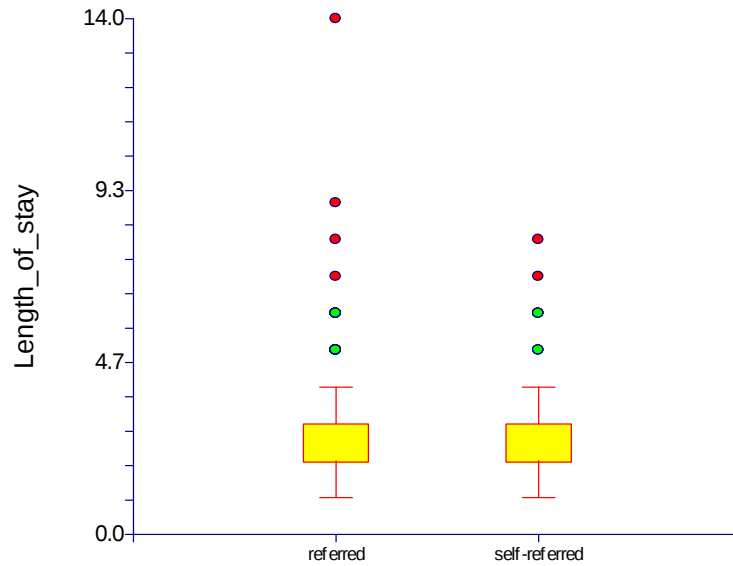


Figure 4.4 Box-plot for length of stay (in days)

4.4 REFERRAL

4.4.1 TIME OF ARRIVAL

The study found a significant association between time of arrival and referral (Chi-square test, $p < 0.01$) (Table 4.21). More referred patients arrived after hours in comparison to self-referred patients.

Table 4.21 Time of arrival

	Total	Referred	Self-referred
After hours	374 (62.5%)	302 (67.3%)	72 (48%)
Working hours	224 (37.5%)	147 (32.7%)	77 (52%)
Total	598 (100%)	449 (100%)	149 (100%)

4.4.2 TRANSPORT

The study found a significant association between type of transport used and referral (Chi-square test, $p < 0.05$) (Table 4.22). More referred patients arrived with ambulance in comparison to self-referred patients.

Table 4.22 Transport

	Total	Referred	Self-referred
Ambulance	522 (87.3%)	399 (88.7%)	124 (83.3%)
Public transport	2 (0.4%)	0	2 (1.4%)
Private transport	10 (1.7%)	8 (1.7%)	2 (1.4%)
Self transport	63 (10.6%)	43 (9.5%)	21 (13.9%)
Total	598 (100%)	449 (100%)	149 (100%)

4.4.3 DISTANCE BETWEEN PLACE OF RESIDENCE AND PHC FACILITIES

The distribution of distance between places of residence and PHC facilities (Clinic and CHC) is presented in Table 4.23 (Figure 4.5). As the distance is not normally distributed, median and IQR were calculated. There were significant differences in the distances from places of residences to nearby health facilities between the referred and self-referred patients (Mann Whitney's U test, $p = 0.04$). The residences of referred patients were farther from the PHC facilities than the self-referred patients.

Table 4.23 Distance between places of residence and PHC facilities

Distance in km	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	12 (10-18)	13 (11-19)	7 (6-16.5)
Range	3 to 35	3 to 35	3 to 35

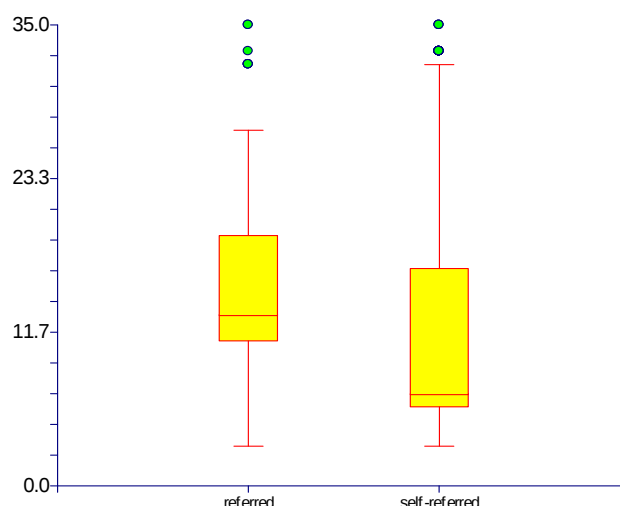


Figure 4.5 Box-plot for distance between places of residences and nearest PHC facilities (in km)

4.4.4 DISTANCE BETWEEN PLACE OF RESIDENCE AND THE HOSPITAL

The distribution of distance between places of residence and the Hospital is presented in Table 4.24 (Figure 4.6). As the distance is not normally distributed, median and IQR were calculated. There were significant differences in the distances from places of residences and the Hospital between the referred and self-referred patients (Mann Whitney's U test, $p < 0.03$). The residences of referred patients were farther away from the Hospital than the self-referred patients.

Table 4.24 Distance between places of residence and the Hospital

Distance in km	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	45 (30-70)	45 (32-70)	40 (24-70)
Range	5 to 232	5 to 155	5 to 232

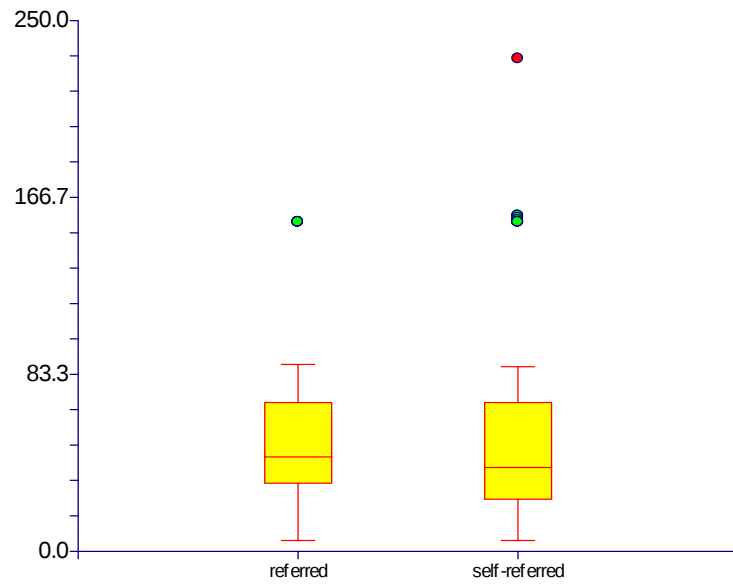


Figure 4.6 Box-plot for distance between places of residences and the Hospital (in km)

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

This study was done in order to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred who delivered at a district hospital (Ganyesa District Hospital) during one year study period (1st April 2008 to 31st March 2009). No study had been conducted at the level of a district hospital in the North West Province to look at the influence of referral status on pregnancy outcomes.

The study population consisted of 599 patients who delivered at the Hospital during the study period. Four hundred forty nine (75%) of them were referred. One hundred and forty nine (25%) patients presented themselves without being referred from any source which was lower than the self-referral rate in Tanzania (70%) (Jan et al, 1998), and in Ghana (82%) (Nkyekeyer, 2000). This is probably better health care system in the District than in other parts of Africa.

5.2 SOCIO-DEMOGRAPHIC PROFILES

The median age was 24 years. There were no significant differences in age between the referred and self-referred patients. The majority of the subjects were black, which is the predominant ethnic group in the area (Municipal Demarcation Board, 2010). Most of the patients were single and unemployed. There were no significant differences in marital and employment status between the two groups. This study could not find any association between the socio-demographic profiles and referral status of the patients.

5.3 OBSTETRIC PROFILE OF PATIENTS

5.3.1 MATERNAL

The majority of the patients were multigravidae. The most common past and current medical disorders were diabetes and pregnancy induced hypertension (PIH), which is one of the common pregnancy associated medical conditions. The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally followed by CS. The majority of CS were performed as an emergency. The pregnancy induced hypertension (PIH) and previous CS were common as maternal indications whereas fetal distress and mal-presentation were common as fetal indications. Prolonged labour and Intra-partum haemorrhage were common intrapartum complications whereas fetal distress and fresh still-birth were common fetal complications. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000) which is of concern.

There were no significant differences in obstetric profiles (such as gravidity, past and present medical disorders, preterm deliveries, mode of deliveries maternal and perinatal complications and outcomes) between the referred and self-referred patients.

5.3.2 PERINATAL

The median birth weight was 3 kg. The incidence of low birth weight (less than 2.5 kg) was 23% (105, 23% among referred and 38, 25% among self-referred patients). Median Apgar scores at 1 and 10 minutes were 8 and 10 respectively. The fresh and macerated stillbirths and low Apgar score were common neonatal complications. The perinatal mortality rate during this period was 53 per 1000 births.

There were no significant differences in perinatal profiles and outcomes (such as birth weight, prevalence of low birth weight, still-birth and low Apgar score) between the referred and self-referred patients.

5.4 REFERRAL

There was a significant association between time of arrival and referral ($p < 0.01$). More referred patients arrived after hours in comparison to self-referred patients. This was interesting because the PHC clinics and CHC should refer more patients during working hours.

The majority of the patients arrived by ambulance (87.3%). There was a significant association between type of transport used and referral ($p < 0.05$). More referred patients arrived with ambulance in comparison to self-referred patients.

The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. There were significant differences in the distances between the referred and self-referred patients ($p = 0.40$). The residences of referred patients were farther from the PHC facilities than the self-referred patients. The median distance between places of residence and the Hospital was 45 km. There were significant differences in the distances between the referred and self-referred patients ($p < 0.03$). The residences of referred patients were farther from the Hospital than the self-referred patients. This suggests that patients who stayed farther away from the hospital goes to the PHC clinic and CHCs which was closer to their home than this Hospital. Therefore, they went to these PHC facilities, who then sent these patients to the Hospital by Ambulance. In contrast, self-referred patients stayed closer to this Hospital and therefore decided to come straight to the Hospital instead of going to nearby PHC facilities.

Tlebere, et al (2007) suggested transport and distance to care, particularly in rural areas played a major role on the utilization of maternal health services in South Africa. This study also found that the geographical distance (from the place of residences to nearby health facilities) was the only factor that had a significant association with referral status.

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 were 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 599 subjects who delivered at the Ganyesa Hospital, a district hospital in a rural district in the North West Province during one year study period. Four hundred forty nine (75%) of them were referred and 149 (25%) patients presented themselves without being referred from any source. The broad purpose of this study was to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred mothers who delivered at the Hospital during the study period.

6.1.1 DETERMINATION OF THE PROFILE OF PATIENTS

The median age of the subjects was 24 years. The majority of the subjects were black. Most of the patients were, single and unemployed.

The majority of the patients were multigravidae. The most common past medical disorders was diabetes. The most common antenatal disorder was pregnancy induced hypertension (PIH). The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally (86.5%) followed by CS (13.2%). The majority of CSs were performed as emergency. The PIH and previous CS were common maternal indications

whereas fetal distress and mal-presentation were common fetal indications. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications. There were 26 (4.3%) post-partum complications. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000).

The median birth weight was 3 kg. The incidence of low birth weight (less than 2.5 kg) was 23%. The median Apgar scores at 1 and 10 minutes were 8 and 10 respectively. The fresh and macerated stillbirths and low Apgar score were common neonatal complications.

The median length of stay was 2 days.

6.1.2 DETERMINATION OF REFERRAL STATUS

The majority of the patients (374, 62.5%) arrived after-hours. The majority of the patients arrived by ambulance (87.3%). The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. The median distance between places of residence and the Hospital was 45 km.

6.1.3 COMPARISON OF THE PROFILES AND OUTCOMES BETWEEN REFERRED AND SELF-REFERRED MOTHERS

There were no significant differences in socio-demographic status between referred and self-referred patients.

There were also no significant differences in obstetric profiles (gravidity, prevalence of past medical disorders and antenatal disorders, prevalence of pre-term deliveries, mode of deliveries) between the two groups. There were no significant differences in terms of intra-partum or post-partum

complications and maternal outcomes between the two groups.

The two groups were not significantly different in terms of birth weight, the incidence of low birth weight and Apgar scores (at 1 minute and 10 minutes) and perinatal complications.

There were no significant differences in length of stay between the referred and self-referred patients.

There was a significant association between time of arrival and referral ($p < 0.01$). More referred patients arrived after hours in comparison to self-referred patients. There was a significant association between type of transport used and referral ($p < 0.05$). More referred patients arrived with ambulance in comparison to self-referred patients. There were significant differences in the distances from place of residences to PHC facilities between the referred and self-referred patients. The residences of referred patients were farther from the PHC facilities than the self-referred patients. There were significant differences in the distances from place of residence and this Hospital between the referred and self-referred patients ($p < 0.03$). The residences of referred patients were farther from the Hospital than the self-referred patients.

6.2 LIMITATIONS OF THE STUDY

The main limitations of this study were missing information on the Hospital Information System. In cases of missing records, the researcher went through the maternity registrars and patients' files to retrieve the missing information.

6.3 RECOMMENDATIONS

6.3.1 FOLLOW-UP

This project is the first systematic study to be done at the Ganyesa District Hospital. This study identified a high maternal and perinatal mortality rates as well as high prevalence of low birth weight. In view of that the researcher would like to suggest that:

- The doctors and midwives working at the Hospital should be retrained with latest guidelines, to reduce maternal and perinatal mortality and morbidity
- There is a need to engage district management and PHC clinics and CHCs to improve the referral system. For example, more patients should be referred during working hours, as there are fewer staff available after working hours.

6.3.2 FUTURE RESEARCH

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

- A qualitative study involving interview with patients and health professionals to develop an understanding of the referral system. This would provide insight as to why certain patients go to health facilities whereas others bypass them.
- A prospective cohort study to develop an understanding of the impact of self-referral on the resource utilization at this Hospital. This would assist to quantify the number of patients who could have been managed at the PHC facilities and delivered at the CHCs.

6.4 SUMMARY AND CONCLUSION

This is the first study in the North West Province which systematically studied hospital records for one year in order to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred patients who delivered at a district hospital (Ganyesa District Hospital) during a one year study period.

The study found that the geographical distance (from the place of residences to nearby health facilities) was the only factor that had a significant association with referral status.

This study identified a high maternal and perinatal mortality rates as well as high prevalence of low birth weight which would require farther investigation.

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APPENDICES

**APPENDIX A: ETHICS CLEARANCE CERTIFICATES
AND LETTERS OF APPROVAL**

APPENDIX B: DATA COLLECTION TOOLS

**COMPARISON OF MATERNAL AND NEONATAL
PROFILES AND OUTCOMES BETWEEN REFERRED
AND SELF-REFERRED PATIENTS DELIVERED AT
THE GANYESA DISTRICT HOSPITAL**

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

Johannesburg, 2011

DECLARATION

I, Abigail Thumeka Mosedi, 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.

.....

March 2011

DEDICATION

This study was dedicated to the staff of the Ganyesa Hospital, the sub-district staff at large and the Dr Ruth Segomotsi Mopati District management team who can use the study as a baseline and a benchmark to measure the impact in other hospitals within the district.

ABSTRACT

BACKGROUND: Maternal health care in South Africa is based on the District Health System model which includes public health facilities (such as primary health care clinics, community health centers and district hospitals) as well as private health facilities. The majority of uncomplicated deliveries are expected to happen at community health centers and only complicated cases are expected to be referred to district hospitals. But in reality, the majority of deliveries in a health district happen in district hospitals. This often results in increasing utilisation of resources and decreased quality of care at these hospitals. The Ganyesa District Hospital, situated in Dr Ruth Segomotsi Mompati District in the North West Province has been facing similar challenges. Although the Hospital has been collecting routine information for the District Health Information System, it has never been analysed systematically to understand the impact of the current referral system on the performance of this Hospital.

Aims: To compare maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital during one year study period (1st April 2008 to 31st March 2009).

Methodology: The setting of this study was Ganyesa District Hospital, in the Dr Ruth Segomotsi Mompati District in the North West Province. A Cross sectional study design was used utilising retrospective data, from the Hospital information systems. The MS excel software based data extraction tool was designed to obtain data from Hospital Information System. The variables used for this study included socio-demographic and clinical profiles of patients. A comparative statistical analysis were done to compare the profile of two groups of patients: (Referred and Self-referred)

Results: The majority of the subjects were black. Most of the patients were, single and unemployed. The majority of the patients were multigravidae. The most common past and current medical disorders were diabetes and pregnancy induced hypertension (PIH). The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally (86.5%) followed by CS (13.2%). The majority of CSs were performed as

emergency. PIH and previous CS were common maternal indications whereas fetal distress and mal-presentation were common fetal indications. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications. There were 26 (4.3%) post-partum maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000).

The incidence of low birth weight (less than 2.5 kg) was 23%. The fresh and macerated stillbirths and low Apgar score were common neonatal complications.

The majority of the patients (374, 62.5%) arrived after-hours. The majority of the patients arrived by ambulance (87.3%). The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. The median distance between places of residence and the Hospital was 45 km.

There were no significant differences in socio-demographic (age, ethnicity, marital and employment status) and obstetric profiles (gravidity, prevalence of past medical disorders and antenatal disorders, prevalence of pre-term deliveries, mode of deliveries, intra-partum or post-partum complications and maternal outcomes.) between referred and self-referred patients. The two groups were not significantly different in terms of birth weight, the incidence of low birth weight, and Apgar scores (at 1 minute and 10 minutes) and neonatal complications.

More referred patients arrived after hours in comparison to self-referred patients. More referred patients arrived with ambulance in comparison to self-referred patients. The self-referred patients stayed closer to health facilities. This was probably the reason these patients decided to come to Hospital instead of going to their nearby PHC clinics.

Conclusion: Findings of this study will be reported to the district and provincial department of health and hopefully will be used for improvement of maternal health services in the Dr Ruth Segomotsi Mompati District.

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GLOSSARY OF TERMS

Apgar score: The Apgar score was devised in 1952 by Dr. Virginia Apgar as a simple and repeatable method to quickly and summarily assess the health of newborn children immediately after birth. The Apgar score is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10. Low Apgar score is defined as score below 6 (0-5).

District Hospital: A District Hospital provides three important roles within a district health system: (a) Provision of support to primary health care clinics and community services, in terms of clinical care and public health expertise (b) Provision of first level hospital care for the district and (c) Accepting the referral from clinics and/or community health centers, and be responsible for referring patients to secondary and/ or tertiary hospitals (Department of Health, 2002).

ICD-10 code: The ICD-10 code (International Classification of Diseases and related health problems - 10th revision) is a coding system developed by the World Health Organization (WHO), that standardizes the written description of medical and health information into codes in a standardized format (WHO, 2010).

Low birth weight: Low birth weight is defined as a weight of less than 2500 g (up to and including 2499 g), irrespective of gestational age.

Referral system: It can be defined as any process in which health care providers at lower levels of the health system, who lack the skills, the facilities, or both to manage a given clinical condition, seek the assistance of providers who are better equipped or specially trained to guide them in managing or to take over responsibility for a particular episode of a clinical condition in a patient (Department of Health, 2002).

Referred maternity patients: Patients who were referred from the primary health care clinics and community health centers during antepartum, intraparum or postpartum period based on provincial and national guidelines (Department of Health, 2007a).

Self-referred maternity patients: Patients who were not referred from the primary health care clinics and community health centers during their pregnancy based on provincial and national guidelines (Department of Health, 2007a).

LIST OF ABBREVIATIONS

ANC	Ante Natal Clinic
CHC	Community Health Centers
CS	Caesarean section
Dr. RSM	Dr Ruth Segomotsi Mompati District
IQR	Inter quartile range
MGD	Millennium Development Goals
PHC	Primary Health Care
PIH	Pregnancy Induced Hypertension
PNC	Postnatal Clinic
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to compare maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital. 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

All over the world, the district model is recommended as the preferred model for maternal healthcare delivery. The WHO recommends that there should be at least four facilities offering basic emergency care and one facility offering comprehensive emergency obstetric care within a health district of 500,000, the WHO recommends (WHO. 2009).

The South African Department of Health adopted a similar model. The community health centres (CHC) and fixed and mobile primary health care (PHC) facilities offer basic maternity care, whereas district and regional hospitals are expected to offer comprehensive maternity care (Figure 1.1). Pregnant patients are supposed to access antenatal services at their nearest clinics and, if a doctor's opinion is required, then patients can be referred to CHCs. Patients requiring normal deliveries are expected to be delivered at the CHCs (managed by professional nurses and midwives), whereas complicated cases are referred to either a district hospital (managed by generalist doctors) or a regional or tertiary hospital (managed by specialist doctors), if they require specialist intervention. Ideally, each health district should have a regional hospital whereas each health sub-district should have a district hospital and few CHCs where delivery should take place based on the nature of complexity (Department of Health, 2007a).

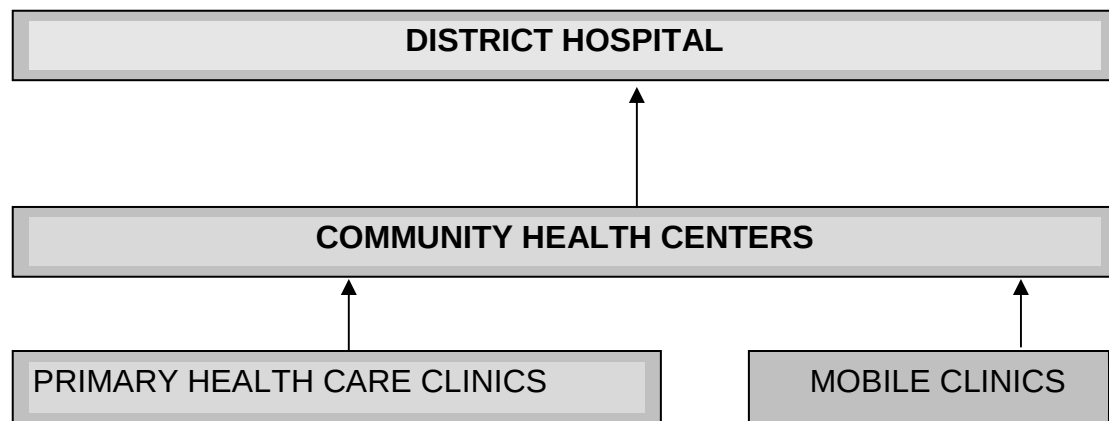


Figure 1.1 Referral network for the health sub-district

1.2 STATEMENT OF THE PROBLEM

The Ganyesa District Hospital is situated in the Dr Ruth Segomotsi Mompati District in the North West Province. Although the infrastructure is poorly developed in this rural district, the public health services are fully functional including a maternity unit at the Hospital. There are five CHCs referring directly to the Hospital. In addition, there are peripheral fixed clinics referring to the CHCs and mobile stations providing outreach services to the farm areas and communities that have limited access to these clinics. Antenatal check-ups are routinely done at the PHC clinics and uncomplicated deliveries are expected to be performed at CHCs. Complicated cases that would require attention by medical doctors are expected to be referred to the Ganyesa District Hospital (Department of Health, 2007a). The performance indicators for obstetrics services in the Hospital are listed in Table 1.1.

Table 1.1 Ganyesa Hospital indicators for obstetric services

	2006/07	2007/08	2008/09
Number of beds allocated	12	15	15
Total Admissions	672	784	820
Average length of stay (days)	5	4	4
Bed occupancy rate	72%	83%	87%
Number of normal deliveries	534	587	598
Caesarean section rate	24%	38%	34%
Number of fresh still births	18	23	9
Number of macerated still births	14	28	15
Number of maternal deaths	2	1	4
Number of neonatal deaths	32	51	24

The above figures show that the Hospital has an increasing number of admissions and bed occupancy rates, high caesarean section rates and significant numbers of maternal and neonatal deaths. This raises concerns about the maternity services offered in this Hospital.

1.3 JUSTIFICATION OF THIS STUDY

Maternal health care in South Africa is based on the District Health System model which includes public health facilities (such as primary health care clinics, community health centers and district hospitals) as well as private health facilities. The majority of uncomplicated deliveries are expected to happen at CHCs and only complicated cases are expected to be referred to district hospitals. But, the district statistics showed that the majority of deliveries in the Dr Ruth Segomotsi Mompati District happen in district hospitals such as the Ganyesa District Hospital. Although the referral system for maternity patients is well-developed in the District, the number of deliveries is steadily increasing (from 534 in 2006/7 to 675 in 2008/9) at this Hospital. The monthly indicators for the maternity unit in the Ganyesa District Hospital showed a high caesarean section rate (34% in 2008/9) (above the identified district target of 11%) and a high maternal mortality ratio (200 per 100 000 in 2008/9). However, there was no increase in annual resources allocated to the Hospital (finance, material and human resources) during the last three years. There is a perception that the increase in the number of deliveries and

decrease in quality of services (such as high caesarean section, neonatal mortality rate and maternal mortality rates) are due to an increasing number of self-referred patients who bypass the referral system and come straight to the Hospital. However, no formal study has been done to systematically evaluate the current situation and to develop a better understanding of the impact of the increasing number of maternity patients. This study analysed the routinely collected data in an attempt to improve maternity services within the Hospital and the District.

1.4 RESEARCH QUESTION

What are the differences in the maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital during the study period (1st April 2008 to 31st March 2009)?

1.5 STUDY OBJECTIVES

1.5.1 BROAD OBJECTIVE

To compare the pregnancy outcomes (maternal and neonatal profiles and outcomes) between referred and self-referred patients delivered at the Ganyesa District Hospital during the study period (1st April 2008 to 31st March 2009)

1.5.2 SPECIFIC OBJECTIVES

1. To determine the profile (Socio-demographic and clinical) of mothers (referred and self-referred) who delivered at the Maternity Unit during the study period
2. To determine referral status and associated factors (Geographical distance, reasons for referral, time of referral, transport)
3. To compare the profiles and outcomes between referred and self-referred mothers

1.6 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 are described below.

Chapter Two: Literature Review: The purpose of the literature review is to review pertinent literature and to discuss concepts related to the maternity services with particular reference to antenatal booking at district hospitals in South Africa and elsewhere.

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

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

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

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

CHAPTER 2

REVIEW OF LITERATURE

In this chapter, relevant literature into the maternal health services with particular reference to referral of pregnant mothers are discussed. In addition to published literature, information from various unpublished sources is also reviewed.

2.1 MATERNAL HEALTH SERVICES

Maternal and child health services have been identified as priority programs throughout the world. These programs are monitored in various countries through the Millennium Development Goals (MDGs). The member states of the World Health Organization (WHO) have made a commitment for achievement of the targets by 2015. The WHO is also using these priority programs to measure the level of development in health services of member countries (WHO, 2007). Although progress has been made in reducing maternal and child mortality, it appears unlikely that the target will be met by 2015 in many countries, particularly those from sub-Saharan Africa (UNO, 2008). South Africa has also adopted these goals as a priority and has developed indicators for monthly monitoring and evaluation in order to improve maternal and child health services.

More than a decade after the introduction of democracy in 1994, South Africa has one of the most progressive and comprehensive reproductive health policies and laws in the world but this has not translated to improvement of maternal health services in the country (Cooper, Morroni, Orner, et al., 2004).

In the South African context, the concept of the MDGs has been adopted at national and provincial levels, and interventions were developed in line with improving child and maternal health services in order to reduce perinatal and maternal mortality. The WHO Guidelines for saving mothers have been

developed to be followed by all institutions offering maternal health services. The report indicated that 38.4% of the deaths were due to avoidable factors, including poor transport, lack of health facilities, and lack of appropriately trained staff (Department of Health, 2007b) which were similar to the previous reports (Department of Health, 1999). This shows that there has been very little progress in South Africa regarding improvement of maternal and child health services in terms of improvement of administrative factors which might be able to reduce maternal mortality and morbidity. Similarly, 'Saving babies report' identified factors associated with perinatal mortality and morbidity (Department of Health, 2008)

Tlebere, Jackson, Loveday, et al. (2007) suggested the following factors might have an impact on utilization of maternal health services in South Africa: (1) transport and distance to care, particularly in rural areas; (2) poor providers' communication with families. However, they found that health-seeking behaviour was better than anticipated.

2.2 MATERNAL REFERRAL SYSTEM

A well-functioning referral system is a necessary element of successful safe motherhood programmes in developing countries. It is an essential component of a district health system. A good maternal referral system provides essential access to emergency obstetric care and supports antenatal and delivery care in first line facilities such as PHC clinics and CHCs (Jahn and De Brouwere, 2001).

Murray and Pearson (2006) suggested 'a successful maternity referral system should include following: (a) a referral strategy based on the assessment of population needs and health system capabilities (b) a well resourced referral centre; (c) active collaboration among different levels of health facilities (d) formalised communication and transport arrangements among these facilities (e) specific protocols for referrer and receiver; (e) supervision and accountability for providers' performance; (f) affordable service costs; (g) the

capacity to monitor effectiveness; and (h) underpinning all of these, policy support'.

In South Africa, the district health system prescribes that all antenatal care patients except complicated cases (such as previous caesarean section, medical disorders in pregnancy) must be managed by professional nurses at primary health care clinics. When a patient's health problem cannot be managed at the clinic level, that patient may be referred to the community health centre normally visited or staffed with a permanent medical officer. A patient must only be referred to a district hospital when health problems can not be managed at this level (Couper and Hugo, 2007). The referral system in the Dr Ruth Segomotsi Mompati District is similar to the pattern elsewhere in South Africa. However, patients often bypass the clinics and CHCs and come straight to the Ganyesa District Hospital

Jahn, et al (2001) observed that the actual use of a referral system for obstetric care in developing countries was inversely related to the risk of complications. This implies that there is a large difference between the proportion of pregnant women being identified as "at risk" and those who actually attend referral level care. They found in referral hospitals, self-referral for delivery were often without specific medical reasons. This form of referrals (self-referrals) was the most common mode of referral, while institutional referral was less frequent and emergency referral was very rare. This pattern was found in a rural district Tanzania (Jahn and Kowalewski, 1998), a teaching hospital in Ghana (Nkyekeyer, 2000), as well as a rural district in Nepal (Jahn, Dar Lang, Shah, et al, 2000). For example, Jan et al (1998), reported in a rural district in Tanzania, self-referrals constitute more than 70%, institutional referral around 30% and emergency referral less than 5% of women at referral level. Nkyekeyer (2000) found 82% self referrals and 2% emergencies among hospital deliveries in a teaching hospital in Ghana.

The following factors have been identified that might have an influence on referral systems (Jahn, et al, 2001): (a) distance, (b) cost, (c) perceived quality of obstetric care, (d) health workers attitude and (e) respect for women's

social needs, (f) perceived aetiology of complications and socio-cultural preferences. It is not known if these factors also influence the maternal referral system in South Africa. More research is required to determine how maternity referral system can be improved so that the majority of the women deliver at the CHCs.

2.3 IMPACT OF REFERRAL SYSTEM ON RESOURCE UTILIZATION

Resource utilization is one of the major decisions to be taken by the hospital executives to ensure appropriate expenditure and proper use of resources. There are several indicators that can be utilized in an obstetric unit to measure effective use of resources. Efficiency indicators, such as the length of stay, are the measures that can be used to determine whether resources are used effectively (Eriksen, Kristiansen, Nord, et al., 1999). Inappropriate admissions often contribute to inappropriate use of resources, resulting in unplanned expenditure in hospitals. This resulted in limited benefits for appropriate patients of these institutions. (Jankowski, 1993). The Ganyesa District Hospital is a level one hospital that provides the core package of level one service. It is supposed to receive referred patients from the CHCs but this is often flouted because of self-referrals and the departmental policies of open access. This results in increased costs for medications and other supplies that could be avoided. It is therefore important that the referral system should be well-coordinated and implemented in line with the agreed upon provincial and national criteria (Department of Health, 2007a).

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 a retrospective record review conducted at a district hospital in the North West Province.

3.2 STUDY SETTING

The study setting was the Obstetric unit of the Ganyesa District Hospital, situated in the Dr. Ruth Segomotsi Mompati District in the southern part of the North West Province.

Dr. Ruth Segomotsi Mompati District

Dr. Ruth Segomotsi Mompati District (formerly Bophirima District Municipality) is one of the four districts of North West province of South Africa. The seat of Mompati District is Vryburg. The majority of its 439,637 people speak Setswana (2001 Census). More than 50% of the population (229,254, 52.15%) is female. Majority of them are black (405,675, 92%). Approximately third of the population (32%) is in the reproductive age group (15 to 45 years of age).

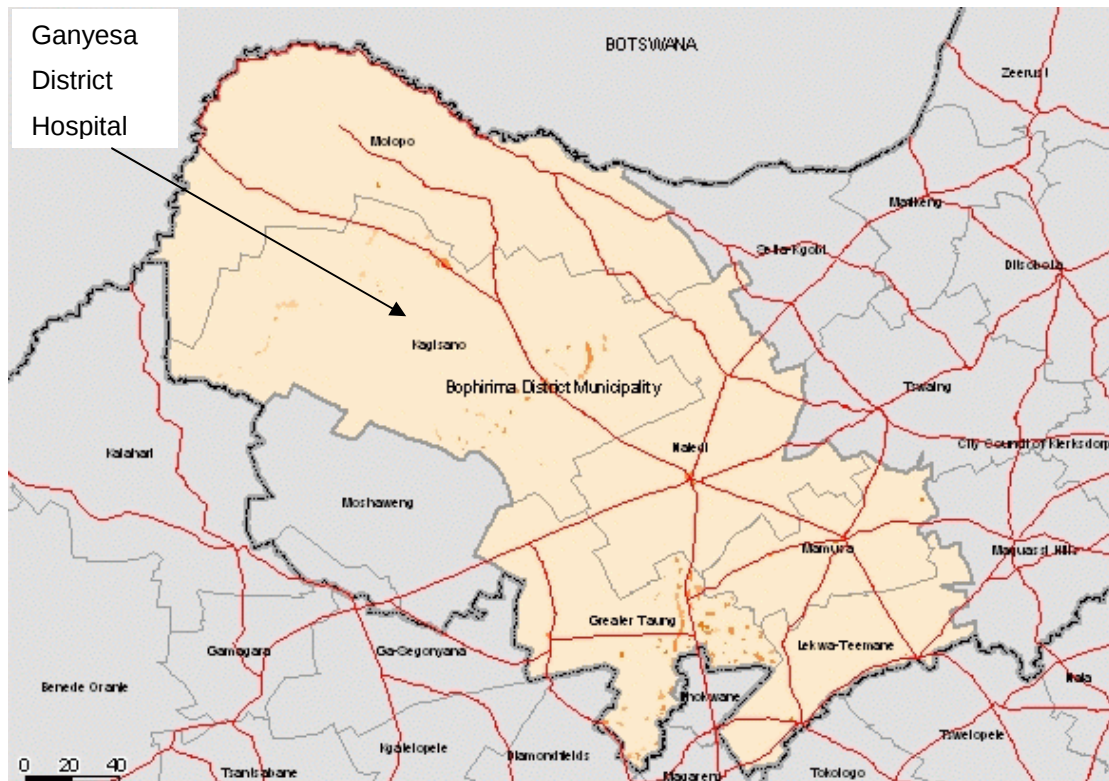


Figure 3.1 Dr. Ruth Segomotsi Mompoti District

There are five sub-districts within the District: Greater Taung, Kagisano, Naledi, Mamusa, Lekwa-Teemane and Molopo. Each of the five sub-districts in the District has a district hospital, few community health centers (CHC) and a number of primary health care (PHC) clinics. Mobile clinics are used to access the farm areas and those villages without fixed clinics. There is no regional hospital in the District.

Ganyesa District Hospital

Ganyesa District Hospital is situated at Ganyesa in the Kagisano Health sub-District. The Hospital is a 60-bed institution with 15 beds allocated for obstetric services. The activities of the unit include antenatal care, delivery (including assisted delivery and caesarean section) and postnatal care. There are six midwives and six auxiliary nurses and one doctor working in the Unit.

3.3 STUDY SCOPE

This study involved retrospective records review of routinely collected data from the Hospital Information System. No primary data collection was done for this study. No intervention was done as a part of this study.

3.4 STUDY PERIOD

The study period was one year from 1st April 2008 to 31st March 2009.

3.5 STUDY POPULATION AND SAMPLING

The study population comprised all the patients who delivered at the Maternity Unit of the Hospital during the study period. The entire study population was included in the study. Therefore, no sampling was done.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data were extracted from the Hospital Information System which records detailed information about the profiles and outcomes of patients who deliver at the Ganyesa District Hospital. Besides the Hospital Information System, the Maternity Unit also keeps manual records of patients admitted and delivered in the Unit.

3.6.2 STUDY INSTRUMENT

The data used for this study were extracted from the Hospital Information System to MS Excel using the tools designed for this study (Appendix B).

3.6.3 VARIABLES

Variables used in this study are listed below.

- Demographic characteristics (Age, Ethnicity, Marital status, Employment status, Occupation, Place of residence)
- Clinical: Maternal (Parity, Past medical history, Ante-partum diseases, Mode of delivery, Reasons for caesarean sections), and Neonatal (Birth weight, Apgar score) and Length of stay
- Referral (Source of referral, Geographical distance, Reasons for referral and time and transport)

The following new variables were created:

- Geographical distance- The nearest clinics were identified from the Dr. Ruth Segomotsi Mompati District office. Geographical distance between place of residence and (i) nearest PHC and (ii) Ganyesa District Hospital were calculated using the information available at the Dr. Ruth Segomotsi Mompati District office.
- Staff to patient ratio- The staff to patient ratio was calculated based on the ratio between the number of patients seen per month and the staff working during the period.

3.6.4 DATA ANALYSIS

The data was captured in the MS Excel based spreadsheets (Appendix B). Then data was then cleaned by looking at missing entry or any error. Subsequently, data was exported to NCSS software for analysis (NCSS, 2007).

The following descriptive statistics were reported:

- Continuous variables (not normally distributed): median and inter-quartile range, and
- Nominal and ordinal variables (such as ethnicity): proportions.

A comparative analysis was done between referred and self-referred patients using following statistical tests:

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

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

3.7 PILOT STUDY

No pilot study was done as the data to be used for this study is routinely collected.

3.8 ETHICAL CONSIDERATIONS

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

CHAPTER 4

RESULTS

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

4.1 STUDY POPULATION

The study population consisted of 599 patients who delivered at the Hospital during the study period. Four hundred forty nine (75%) of them were referred (Table 4.1). One hundred and forty nine (25%) patients presented themselves without being referred from any source.

Table 4.1 Referral source

Referral source	Total n (%)
Mobile clinic	2 (0.4%)
PHC clinic	31 (6.9%)
Community Health Centre	394 (87.8%)
Private practioners	22 (4.9%)
Total	450 (100%)

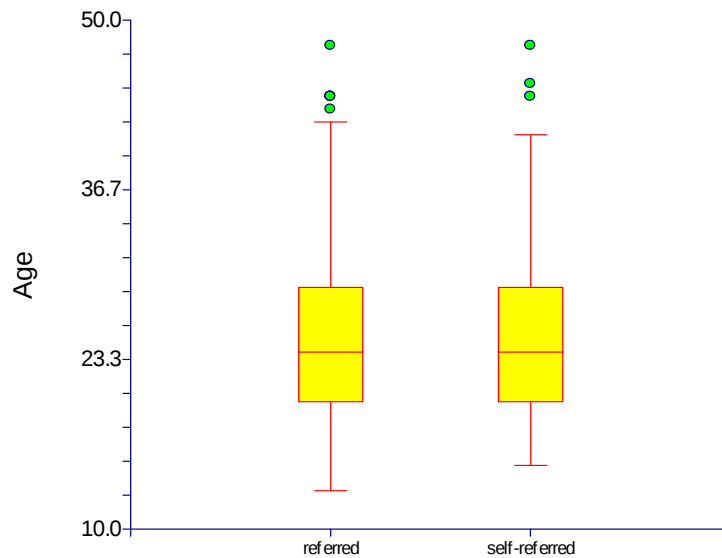
4.2 SOCIO-DEMOGRAPHIC PROFILES OF PATIENTS

4.2.1 AGE

The distribution of age of the subjects is presented in Table 4.2 (Figure 4.1). As age is not normally distributed, median and IQR were calculated. There were no significant differences in age between the referred and self-referred patients (Mann Whitney's U test, $p = 0.60$).

Table 4.2 Age distribution of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	24 (20-29)	24 (20-29)	24 (20-29)
Range	13 to 48	13 to 48	15 to 48

**Figure 4.1 Box-plot for age (in years)**

4.2.2 ETHNICITY

The ethnicity of the subjects is presented in Table 4.3. The majority of the subjects were black.

Table 4.3 Ethnicity of the subjects

	Total	Referred	Self-referred
Black	594 (99.3%)	445 (99.1%)	149 (100%)
Indian	2 (0.3%)	2 (0.4%)	0
Coloured	1 (0.2%)	1 (0.2%)	0
White	1 (0.2%)	1 (0.2%)	0
Total	598 (100%)	449 (100%)	149 (100%)

4.2.3 MARITAL STATUS

The marital status of the subjects is presented in Table 4.4. The majority of the subjects were single. There were no significant differences in marital status between the two groups (Chi-square test, $p = 0.58$).

Table 4.4 Marital status of the subjects

	Total	Referred	Self-referred
Married	49 (8.2%)	35 (7.8%)	14 (9.4%)
Divorced	6 (1%)	6 (1.3%)	0
Widow	7 (1.2%)	5 (1.1%)	2 (1.3%)
Single	515 (86.1%)	384 (85.9%)	129 (86.6%)
Minor	21 (3.5%)	17 (3.8%)	4 (2.7%)
Total	598 (100%)	449 (100%)	149 (100%)

4.2.4 EMPLOYMENT STATUS

The employment status of the subjects is presented in Table 4.5. The majority of the subjects were unemployed. There were no significant differences in employment status between the two groups (Chi-square test, $p = 0.87$).

Table 4.5 Employment status of the subjects

	Total	Referred	Self-referred
Employed	18 (3%)	14 (3.1%)	4 (2.7%)
Minor	21 (3.5%)	15 (3.3%)	6 (4%)
Student	5 (0.8%)	4 (0.9%)	1 (0.7%)
Unemployed	553 (92.6%)	415 (92.6%)	138 (92.6%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3 OBSTETRIC PROFILE OF PATIENTS

4.3.1 MATERNAL

4.3.1.1 GRAVIDITY

The distribution of gravidity of the subjects is presented in Table 4.6 (Figure 4.2). As gravidity is not normally distributed, median and IQR were calculated. There were no significant differences in gravidity between the referred and self-referred patients (Mann Whitney's U test, $p = 0.60$).

Table 4.6 Gravidity of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	2 (1-3)	2 (1-3)	2 (1-3)
Range	1 to 7	1 to 7	1 to 6
GRAVIDITY			
1	238 (39.9%)	179 (39.9%)	59 (39.9%)
2 to 5	353 (59.1%)	265 (59%)	88 59.5%
More than 5	6 (1%)	5 (1.1%)	1 (0.7%)

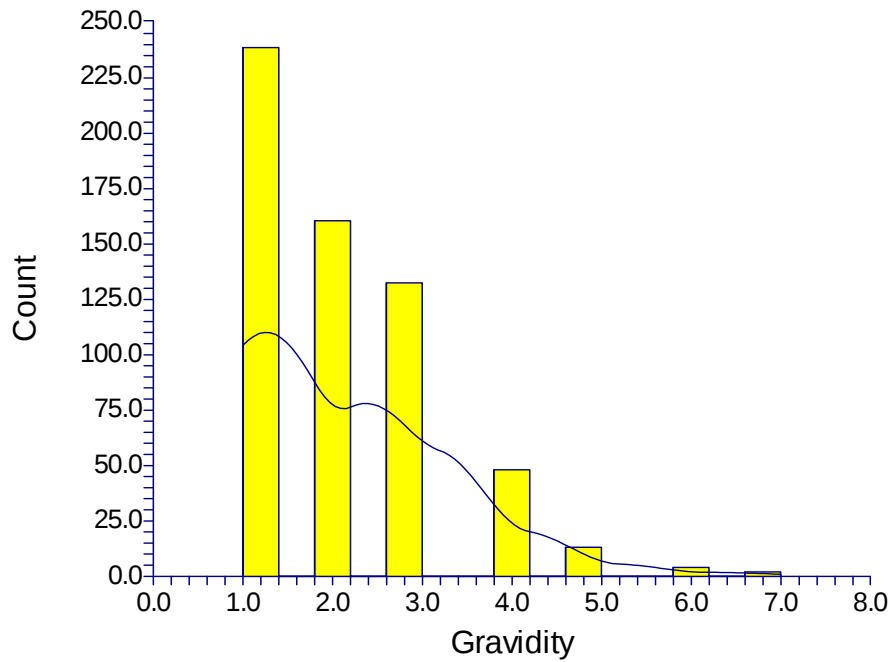


Figure 4.2 Gravidity of the subjects

4.3.1.2 PAST MEDICAL DISORDERS

The past medical disorders of the subjects are presented in Table 4.7. There were no significant differences in prevalence of past medical disorders between the referred and self-referred patients (Chi-square test, $p=0.11$).

Table 4.7 Past medical history of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
PTB	3 (0.5%)	1 (0.2%)	2 (1.3%)
Asthmatic	2 (0.3%)	1 (0.2%)	1 (0.7%)
Diabetic	16 (2.7%)	11 (2.4%)	5 (3.4%)
Hypertensive	2 (0.3%)	2 (0.4%)	0
Mental	9 (1.5%)	6 (1.3%)	3 (2%)
Renal	3 (0.5%)	1 (0.2%)	2 (1.3%)

4.3.1.3 ANTE-PARTUM DISEASES

The ante-partum disorders of the subjects are presented in Table 4.8. There were no significant differences in prevalence of ante-partum diseases between the referred and self-referred patients (Chi-square test, $p=0.08$).

Table 4.8 Past medical history of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
PIH	13 (2.2%)	11 (2.4%)	2 (1.3%)
Generalised oedema	2 (0.3%)	0	2 (1.3%)
Proteinuria	6 (1%)	5 (1.1%)	1 (0.7%)
Urinary Tract Infection	3 (0.5%)	1 (0.2%)	2 (1.3%)
Anaemia	2 (0.3%)	2 (0.4%)	0
Poor weight gain	6 (1%)	5 (1.1%)	1 (0.7%)
TB	1 (0.2%)	0	1 (0.7%)
Poly-hydramnios	7 (1.2%)	5 (1.1%)	2 (1.3%)

4.3.1.4 TERM AND PRE-TERM DELIVERY

The prevalence of pre-term deliveries of the subjects is presented in Table 4.9. There were no significant differences in prevalence of pre-term deliveries between the two groups (Chi-square test, $p = 0.65$).

Table 4.9 Pre-term deliveries among the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Pre-tem	89 (14.8%)	68 (15.1%)	20 (13.6%)
Term	509 (85.2%)	381 (84.9%)	129 (86.4%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3.1.5 MODE OF DELIVERY

The mode of deliveries of the subjects is presented in Table 4.10. There were no significant differences in terms of mode of deliveries between the two groups (Chi-square test, $p = 0.23$).

Table 4.10 Pre-term deliveries among the subjects

	Total	Referred	Self-referred
Normal vaginal delivery	517 (86.5%)	394 (87.8%)	123 (82.6%)
Caesarean section	79 (13.2%)	54 (12%)	25 (16.8%)
Vacuum	2 (0.3%)	1 (0.2%)	1 (0.7%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3.1.6 CAESAREAN SECTION

The study found no significant association between types of CS and referral (Chi-square test, $p = 0.42$) (Table 4.11).

Table 4.11 Type of caesarean section

	Total	Referred	Self-referred
Elective	23 (29.1%)	13 (25.9%)	9 (36%)
Emergency	56 (70.9%)	1 (74.1%)	16 (64%)
Total	79 (100%)	54 (100%)	25 (100%)

The indications for caesarean sections are presented in Table 4.12. There were no significant differences in terms of mode of deliveries between the two groups (Chi-square test, $p = 0.88$). The pregnancy induced hypertension (PIH) and previous CS were common maternal indications whereas fetal distress and mal-presentation were common fetal indications.

Table 4.12 Pre-term deliveries among the subjects

	Total	Referred	Self-referred
PIH	18 (22.8%)	13 (24.1%)	5 (20%)
APH	2 (2.5%)	1 (1.9%)	1 (4%)
PROM	1 (1.3%)	1 (1.9%)	0
CPD	3 (3.8%)	3 (5.6%)	0
Previous CS	9 (11.4%)	5 (9.3%)	4 (16%)
Prolonged 1st stage	1 (1.3%)	1 (1.9%)	0
Prolonged 2nd stage	4 (5.1%)	2 (3.7%)	2 (8%)
Mal-presentation	19 (24.1%)	13 (24.1%)	6 (24%)
Multiple pregnancy	3 (3.8%)	1 (1.9%)	2 (8%)
Fetal distress	19 (24.1%)	14 (25.9%)	5 (20%)
Total	79 (100%)	54 (100%)	25 (100%)

4.3.1.7 COMPLICATIONS AT DELIVERY

The intra-partum complications at delivery are described in Table 4.13. There were 41 (9%) complications among the referred patients in comparison to 10% among the self-referred patients. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications, There were no significant differences in terms of intra-partum complications between the two groups (Chi-square test, $p = 0.67$).

Table 4.13 Intra-partum complications among the subjects

	Total	Referred	Self-referred
Eclampsia	2 (3.5%)	2 (4.9%)	0
Intra-partum haemorrhage	10 (17.5%)	8 (19.5%)	2 (12.5%)
Precipitate labour	5 (8.8%)	4 (9.8%)	1 (6.3%)
Prolonged labour	17 (29.8%)	13 (31.7%)	4 (25%)
Offensive liquor	1 (1.8%)	1 (2.4%)	0
Fetal distress	6 (10.5%)	4 (9.8%)	2 (12.5%)
Fresh still birth	8 (14%)	5 (12.2%)	3 (18.8%)
Failure to diagnosis mal-presentation	2 (3.5%)	0	2 (12.5%)
cord prolapse	6 (10.5%)	4 (9.8%)	2 (12.5%)
Total	57 (100%)	41 (100%)	16 (100%)

4.3.1.8 POST-PARTUM COMPLICATIONS

The post-partum complications at delivery are described in Table 4.14. There were 21 (4.6%) post-partum complications among the referred patients in comparison to 3.3% among the self-referred patients. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were no significant differences in terms of intra-partum complications between the two groups (Chi-square test, $p = 0.20$).

Table 4.14 Intra-partum complications among the subjects

	Total	Referred	Self-referred
PIH	11 (42.3%)	10 (47.6%)	1 (20%)
PPH	7 (26.9%)	4 (19%)	3 (60%)
Postpartum anaemia	4 (15.4%)	4 (19%)	0
Gaping episiotomy	2 (7.7%)	1 (4.8%)	1 (20%)
Secondary suturing	2 (7.7%)	2 (9.5%)	0
Total	26 (100%)	21 (100%)	5 (100%)

4.3.1.9 MATERNAL OUTCOME

The maternal outcomes are described in Table 4.15. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/100,000) which is of concern. There were no significant differences in terms of maternal outcome between the two groups (Chi-square test, $p = 0.23$).

Table 4.15 Intra-partum complications among the subjects

	Total	Referred	Self-referred
Death	3 (0.5%)	3 (0.7%)	0
Discharged	586 (98.2%)	441 (98.2%)	145 (97.3%)
Referred to regional hospital	9 (1.5%)	5 (1.1%)	4 (2.7%)
Total	598 (100%)	449 (100%)	5 (100%)

4.3.2 PERINATAL

4.3.2.1 BIRTH WEIGHT

The distribution of birth weight of the subjects is presented in Table 4.16 (Figure 4.1). As birth weight is not normally distributed, median and IQR were calculated. There were no significant differences in birth weight between the referred and self-referred patients (Mann Whitney's U test, $p = 0.11$). The incidence of low birth weight (less than 2.5 kg) was 23% (105, 23% among referred and 38, 25% among self-referred patients).

Table 4.16 Birth weight of the subjects

Birth weight in kg	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	3 (2.6 – 3.4)	3 (2.6-3.4)	2 (2-3)
Range	1.4 to 3.9	1.4 to 3.9	1.4 to 3.8

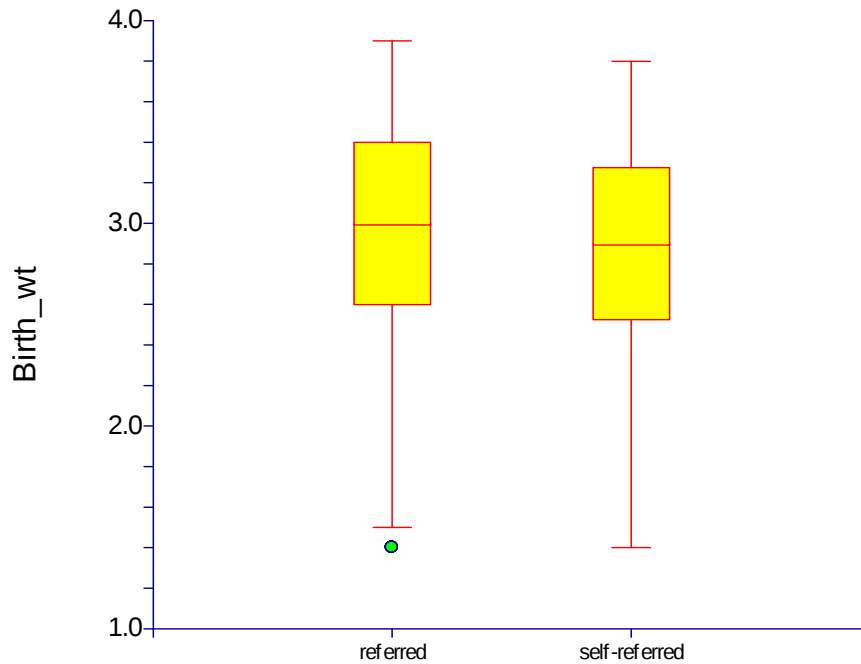


Figure 4.3 Box-plot for birth weight (in kg)

4.3.2.2 APGAR SCORE

The distribution of Apgar scores of the subjects is presented in Table 4.17. As Apgar score is not normally distributed, median and IQR were calculated. There were no significant differences in Apgar scores at 1 minute and 10 minutes between the referred and self-referred patients (Mann Whitney's U test, $p = 0.11$).

Table 4.17 Birth weight of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Apgar score- 1 minute			
Median (IQR)	8 (7-9)	8 (7-9)	8 (7-9)
Range	(0 to 10)	(0 to 10)	(0 to 10)
Apgar score- 10 minutes			
Median (IQR)	10 (9 -10)	10 (9 -10)	10 (9 -10)
Range	0 to 10	0 to 10	0 to 10

4.3.2.3 PERINATAL COMPLICATIONS

The perinatal complications are described in Table 4.18. There were 31 (6.9%) complications among the referred patients in comparison to 13 (8.7%) among the self-referred patients. The fresh and macerated stillbirths and low Apgar score were common neonatal complications. There were no significant differences in terms of neonatal complications between the two groups (Chi-square test, $p = 0.47$).

Table 4.18 Perinatal complications

	Total	Referred	Self-referred
Macerated still birth	11 (23.9%)	8 (23.5%)	3 (25%)
Fresh still birth	12 (26.1%)	10 (29.4%)	2 (16.7%)
Low Apgar score (1-5)	8 (17.4%)	8 (23.5%)	0
Abnormities	4 (8.7%)	2 (5.9%)	2 (16.7%)
Asphyxiated	2 (4.3%)	1 (2.9%)	1 (8.3%)
Aspirated	4 (8.7%)	3 (8.8%)	1 (8.3%)
Jaundice	1 (2.2%)	0	1 (8.3%)
Low birth weight (less than 1 kg)	1 (2.2%)	0	1 (8.3%)
Pyrexia	2 (4.3%)	2 (5.9%)	0
Swollen face	1 (2.2%)	0	1 (8.3%)
Total	44 (100%)	31 (100%)	13 (100%)

4.3.2.4 PERINATAL OUTCOMES

The perinatal outcomes are described in Table 4.19. There were no significant differences in terms of perinatal outcomes between the two groups (Chi-square test, $p = 0.20$).

Table 4.19 Perinatal outcomes

	Total	Referred	Self-referred
Macerated still birth	12 (1.8%)	10 (1.8%)	2 (2%)
Fresh still birth	11 (2%)	8 (2.2%)	3 (1.3%)
Neonatal death	9 (1.5%)	6 (1.3%)	3 (2%)
Discharged	566 (94.6%)	425 (94.7%)	141 (94.6%)
Total	598 (100%)	449 (100%)	149 (100%)

The perinatal mortality rate during this period was 53 per 1000 births.

4.3.3 LENGTH OF STAY (DAYS)

The distribution of length of stay of the subjects is presented in Table 4.20 (Figure 4.4). As length of stay is not normally distributed, median and IQR were calculated. There were no significant differences in length of stay between the referred and self-referred patients (Mann Whitney's U test, $p = 0.40$).

Table 4.20 Length of stay (in days)

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	2 (2-3)	2 (2-3)	2 (2-3)
Range	1 to 14	1 to 14	1 to 8

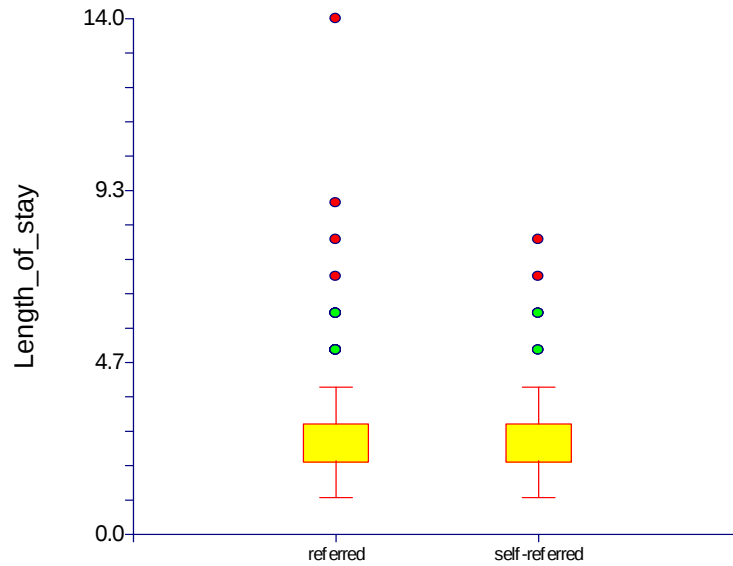


Figure 4.4 Box-plot for length of stay (in days)

4.4 REFERRAL

4.4.1 TIME OF ARRIVAL

The study found a significant association between time of arrival and referral (Chi-square test, $p < 0.01$) (Table 4.21). More referred patients arrived after hours in comparison to self-referred patients.

Table 4.21 Time of arrival

	Total	Referred	Self-referred
After hours	374 (62.5%)	302 (67.3%)	72 (48%)
Working hours	224 (37.5%)	147 (32.7%)	77 (52%)
Total	598 (100%)	449 (100%)	149 (100%)

4.4.2 TRANSPORT

The study found a significant association between type of transport used and referral (Chi-square test, $p < 0.05$) (Table 4.22). More referred patients arrived with ambulance in comparison to self-referred patients.

Table 4.22 Transport

	Total	Referred	Self-referred
Ambulance	522 (87.3%)	399 (88.7%)	124 (83.3%)
Public transport	2 (0.4%)	0	2 (1.4%)
Private transport	10 (1.7%)	8 (1.7%)	2 (1.4%)
Self transport	63 (10.6%)	43 (9.5%)	21 (13.9%)
Total	598 (100%)	449 (100%)	149 (100%)

4.4.3 DISTANCE BETWEEN PLACE OF RESIDENCE AND PHC FACILITIES

The distribution of distance between places of residence and PHC facilities (Clinic and CHC) is presented in Table 4.23 (Figure 4.5). As the distance is not normally distributed, median and IQR were calculated. There were significant differences in the distances from places of residences to nearby health facilities between the referred and self-referred patients (Mann Whitney's U test, $p = 0.04$). The residences of referred patients were farther from the PHC facilities than the self-referred patients.

Table 4.23 Distance between places of residence and PHC facilities

Distance in km	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	12 (10-18)	13 (11-19)	7 (6-16.5)
Range	3 to 35	3 to 35	3 to 35

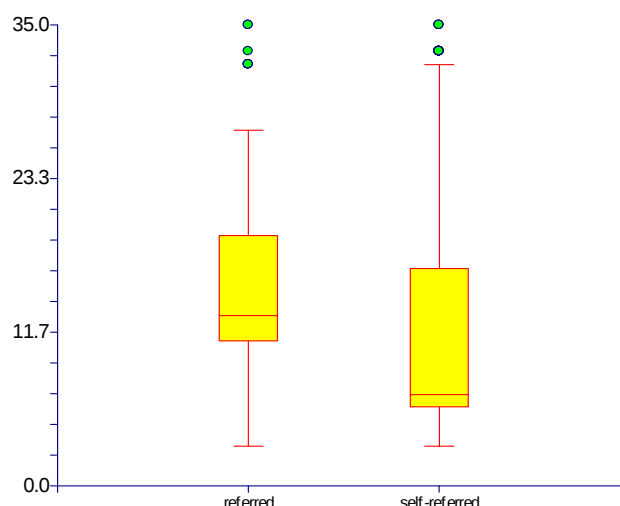


Figure 4.5 Box-plot for distance between places of residences and nearest PHC facilities (in km)

4.4.4 DISTANCE BETWEEN PLACE OF RESIDENCE AND THE HOSPITAL

The distribution of distance between places of residence and the Hospital is presented in Table 4.24 (Figure 4.6). As the distance is not normally distributed, median and IQR were calculated. There were significant differences in the distances from places of residences and the Hospital between the referred and self-referred patients (Mann Whitney's U test, $p < 0.03$). The residences of referred patients were farther away from the Hospital than the self-referred patients.

Table 4.24 Distance between places of residence and the Hospital

Distance in km	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	45 (30-70)	45 (32-70)	40 (24-70)
Range	5 to 232	5 to 155	5 to 232

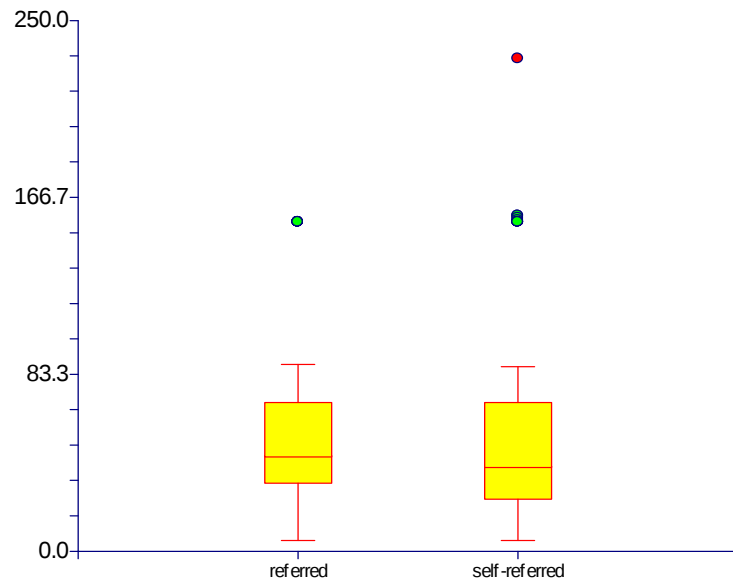


Figure 4.6 Box-plot for distance between places of residences and the Hospital (in km)

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

This study was done in order to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred who delivered at a district hospital (Ganyesa District Hospital) during one year study period (1st April 2008 to 31st March 2009). No study had been conducted at the level of a district hospital in the North West Province to look at the influence of referral status on pregnancy outcomes.

The study population consisted of 599 patients who delivered at the Hospital during the study period. Four hundred forty nine (75%) of them were referred. One hundred and forty nine (25%) patients presented themselves without being referred from any source which was lower than the self-referral rate in Tanzania (70%) (Jan et al, 1998), and in Ghana (82%) (Nkyekeyer, 2000). This is probably better health care system in the District than in other parts of Africa.

5.2 SOCIO-DEMOGRAPHIC PROFILES

The median age was 24 years. There were no significant differences in age between the referred and self-referred patients. The majority of the subjects were black, which is the predominant ethnic group in the area (Municipal Demarcation Board, 2010). Most of the patients were single and unemployed. There were no significant differences in marital and employment status between the two groups. This study could not find any association between the socio-demographic profiles and referral status of the patients.

5.3 OBSTETRIC PROFILE OF PATIENTS

5.3.1 MATERNAL

The majority of the patients were multigravidae. The most common past and current medical disorders were diabetes and pregnancy induced hypertension (PIH), which is one of the common pregnancy associated medical conditions. The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally followed by CS. The majority of CS were performed as an emergency. The pregnancy induced hypertension (PIH) and previous CS were common as maternal indications whereas fetal distress and mal-presentation were common as fetal indications. Prolonged labour and Intra-partum haemorrhage were common intrapartum complications whereas fetal distress and fresh still-birth were common fetal complications. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000) which is of concern.

There were no significant differences in obstetric profiles (such as gravidity, past and present medical disorders, preterm deliveries, mode of deliveries maternal and perinatal complications and outcomes) between the referred and self-referred patients.

5.3.2 PERINATAL

The median birth weight was 3 kg. The incidence of low birth weight (less than 2.5 kg) was 23% (105, 23% among referred and 38, 25% among self-referred patients). Median Apgar scores at 1 and 10 minutes were 8 and 10 respectively. The fresh and macerated stillbirths and low Apgar score were common neonatal complications. The perinatal mortality rate during this period was 53 per 1000 births.

There were no significant differences in perinatal profiles and outcomes (such as birth weight, prevalence of low birth weight, still-birth and low Apgar score) between the referred and self-referred patients.

5.4 REFERRAL

There was a significant association between time of arrival and referral ($p < 0.01$). More referred patients arrived after hours in comparison to self-referred patients. This was interesting because the PHC clinics and CHC should refer more patients during working hours.

The majority of the patients arrived by ambulance (87.3%). There was a significant association between type of transport used and referral ($p < 0.05$). More referred patients arrived with ambulance in comparison to self-referred patients.

The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. There were significant differences in the distances between the referred and self-referred patients ($p = 0.40$). The residences of referred patients were farther from the PHC facilities than the self-referred patients. The median distance between places of residence and the Hospital was 45 km. There were significant differences in the distances between the referred and self-referred patients ($p < 0.03$). The residences of referred patients were farther from the Hospital than the self-referred patients. This suggests that patients who stayed farther away from the hospital goes to the PHC clinic and CHCs which was closer to their home than this Hospital. Therefore, they went to these PHC facilities, who then sent these patients to the Hospital by Ambulance. In contrast, self-referred patients stayed closer to this Hospital and therefore decided to come straight to the Hospital instead of going to nearby PHC facilities.

Tlebere, et al (2007) suggested transport and distance to care, particularly in rural areas played a major role on the utilization of maternal health services in South Africa. This study also found that the geographical distance (from the place of residences to nearby health facilities) was the only factor that had a significant association with referral status.

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 were 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 599 subjects who delivered at the Ganyesa Hospital, a district hospital in a rural district in the North West Province during one year study period. Four hundred forty nine (75%) of them were referred and 149 (25%) patients presented themselves without being referred from any source. The broad purpose of this study was to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred mothers who delivered at the Hospital during the study period.

6.1.1 DETERMINATION OF THE PROFILE OF PATIENTS

The median age of the subjects was 24 years. The majority of the subjects were black. Most of the patients were, single and unemployed.

The majority of the patients were multigravidae. The most common past medical disorders was diabetes. The most common antenatal disorder was pregnancy induced hypertension (PIH). The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally (86.5%) followed by CS (13.2%). The majority of CSs were performed as emergency. The PIH and previous CS were common maternal indications

whereas fetal distress and mal-presentation were common fetal indications. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications. There were 26 (4.3%) post-partum complications. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000).

The median birth weight was 3 kg. The incidence of low birth weight (less than 2.5 kg) was 23%. The median Apgar scores at 1 and 10 minutes were 8 and 10 respectively. The fresh and macerated stillbirths and low Apgar score were common neonatal complications.

The median length of stay was 2 days.

6.1.2 DETERMINATION OF REFERRAL STATUS

The majority of the patients (374, 62.5%) arrived after-hours. The majority of the patients arrived by ambulance (87.3%). The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. The median distance between places of residence and the Hospital was 45 km.

6.1.3 COMPARISON OF THE PROFILES AND OUTCOMES BETWEEN REFERRED AND SELF-REFERRED MOTHERS

There were no significant differences in socio-demographic status between referred and self-referred patients.

There were also no significant differences in obstetric profiles (gravidity, prevalence of past medical disorders and antenatal disorders, prevalence of pre-term deliveries, mode of deliveries) between the two groups. There were no significant differences in terms of intra-partum or post-partum

complications and maternal outcomes between the two groups.

The two groups were not significantly different in terms of birth weight, the incidence of low birth weight and Apgar scores (at 1 minute and 10 minutes) and perinatal complications.

There were no significant differences in length of stay between the referred and self-referred patients.

There was a significant association between time of arrival and referral ($p < 0.01$). More referred patients arrived after hours in comparison to self-referred patients. There was a significant association between type of transport used and referral ($p < 0.05$). More referred patients arrived with ambulance in comparison to self-referred patients. There were significant differences in the distances from place of residences to PHC facilities between the referred and self-referred patients. The residences of referred patients were farther from the PHC facilities than the self-referred patients. There were significant differences in the distances from place of residence and this Hospital between the referred and self-referred patients ($p < 0.03$). The residences of referred patients were farther from the Hospital than the self-referred patients.

6.2 LIMITATIONS OF THE STUDY

The main limitations of this study were missing information on the Hospital Information System. In cases of missing records, the researcher went through the maternity registrars and patients' files to retrieve the missing information.

6.3 RECOMMENDATIONS

6.3.1 FOLLOW-UP

This project is the first systematic study to be done at the Ganyesa District Hospital. This study identified a high maternal and perinatal mortality rates as well as high prevalence of low birth weight. In view of that the researcher would like to suggest that:

- The doctors and midwives working at the Hospital should be retrained with latest guidelines, to reduce maternal and perinatal mortality and morbidity
- There is a need to engage district management and PHC clinics and CHCs to improve the referral system. For example, more patients should be referred during working hours, as there are fewer staff available after working hours.

6.3.2 FUTURE RESEARCH

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

- A qualitative study involving interview with patients and health professionals to develop an understanding of the referral system. This would provide insight as to why certain patients go to health facilities whereas others bypass them.
- A prospective cohort study to develop an understanding of the impact of self-referral on the resource utilization at this Hospital. This would assist to quantify the number of patients who could have been managed at the PHC facilities and delivered at the CHCs.

6.4 SUMMARY AND CONCLUSION

This is the first study in the North West Province which systematically studied hospital records for one year in order to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred patients who delivered at a district hospital (Ganyesa District Hospital) during a one year study period.

The study found that the geographical distance (from the place of residences to nearby health facilities) was the only factor that had a significant association with referral status.

This study identified a high maternal and perinatal mortality rates as well as high prevalence of low birth weight which would require farther investigation.

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APPENDICES

**APPENDIX A: ETHICS CLEARANCE CERTIFICATES
AND LETTERS OF APPROVAL**

APPENDIX B: DATA COLLECTION TOOLS

**COMPARISON OF MATERNAL AND NEONATAL
PROFILES AND OUTCOMES BETWEEN REFERRED
AND SELF-REFERRED PATIENTS DELIVERED AT
THE GANYESA DISTRICT HOSPITAL**

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

Johannesburg, 2011

DECLARATION

I, Abigail Thumeka Mosedi, 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.

.....

March 2011

DEDICATION

This study was dedicated to the staff of the Ganyesa Hospital, the sub-district staff at large and the Dr Ruth Segomotsi Mopati District management team who can use the study as a baseline and a benchmark to measure the impact in other hospitals within the district.

ABSTRACT

BACKGROUND: Maternal health care in South Africa is based on the District Health System model which includes public health facilities (such as primary health care clinics, community health centers and district hospitals) as well as private health facilities. The majority of uncomplicated deliveries are expected to happen at community health centers and only complicated cases are expected to be referred to district hospitals. But in reality, the majority of deliveries in a health district happen in district hospitals. This often results in increasing utilisation of resources and decreased quality of care at these hospitals. The Ganyesa District Hospital, situated in Dr Ruth Segomotsi Mompati District in the North West Province has been facing similar challenges. Although the Hospital has been collecting routine information for the District Health Information System, it has never been analysed systematically to understand the impact of the current referral system on the performance of this Hospital.

Aims: To compare maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital during one year study period (1st April 2008 to 31st March 2009).

Methodology: The setting of this study was Ganyesa District Hospital, in the Dr Ruth Segomotsi Mompati District in the North West Province. A Cross sectional study design was used utilising retrospective data, from the Hospital information systems. The MS excel software based data extraction tool was designed to obtain data from Hospital Information System. The variables used for this study included socio-demographic and clinical profiles of patients. A comparative statistical analysis were done to compare the profile of two groups of patients: (Referred and Self-referred)

Results: The majority of the subjects were black. Most of the patients were, single and unemployed. The majority of the patients were multigravidae. The most common past and current medical disorders were diabetes and pregnancy induced hypertension (PIH). The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally (86.5%) followed by CS (13.2%). The majority of CSs were performed as

emergency. PIH and previous CS were common maternal indications whereas fetal distress and mal-presentation were common fetal indications. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications. There were 26 (4.3%) post-partum maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000).

The incidence of low birth weight (less than 2.5 kg) was 23%. The fresh and macerated stillbirths and low Apgar score were common neonatal complications.

The majority of the patients (374, 62.5%) arrived after-hours. The majority of the patients arrived by ambulance (87.3%). The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. The median distance between places of residence and the Hospital was 45 km.

There were no significant differences in socio-demographic (age, ethnicity, marital and employment status) and obstetric profiles (gravidity, prevalence of past medical disorders and antenatal disorders, prevalence of pre-term deliveries, mode of deliveries, intra-partum or post-partum complications and maternal outcomes.) between referred and self-referred patients. The two groups were not significantly different in terms of birth weight, the incidence of low birth weight, and Apgar scores (at 1 minute and 10 minutes) and neonatal complications.

More referred patients arrived after hours in comparison to self-referred patients. More referred patients arrived with ambulance in comparison to self-referred patients. The self-referred patients stayed closer to health facilities. This was probably the reason these patients decided to come to Hospital instead of going to their nearby PHC clinics.

Conclusion: Findings of this study will be reported to the district and provincial department of health and hopefully will be used for improvement of maternal health services in the Dr Ruth Segomotsi Mompati District.

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GLOSSARY OF TERMS

Apgar score: The Apgar score was devised in 1952 by Dr. Virginia Apgar as a simple and repeatable method to quickly and summarily assess the health of newborn children immediately after birth. The Apgar score is determined by evaluating the newborn baby on five simple criteria on a scale from zero to two, then summing up the five values thus obtained. The resulting Apgar score ranges from zero to 10. Low Apgar score is defined as score below 6 (0-5).

District Hospital: A District Hospital provides three important roles within a district health system: (a) Provision of support to primary health care clinics and community services, in terms of clinical care and public health expertise (b) Provision of first level hospital care for the district and (c) Accepting the referral from clinics and/or community health centers, and be responsible for referring patients to secondary and/ or tertiary hospitals (Department of Health, 2002).

ICD-10 code: The ICD-10 code (International Classification of Diseases and related health problems - 10th revision) is a coding system developed by the World Health Organization (WHO), that standardizes the written description of medical and health information into codes in a standardized format (WHO, 2010).

Low birth weight: Low birth weight is defined as a weight of less than 2500 g (up to and including 2499 g), irrespective of gestational age.

Referral system: It can be defined as any process in which health care providers at lower levels of the health system, who lack the skills, the facilities, or both to manage a given clinical condition, seek the assistance of providers who are better equipped or specially trained to guide them in managing or to take over responsibility for a particular episode of a clinical condition in a patient (Department of Health, 2002).

Referred maternity patients: Patients who were referred from the primary health care clinics and community health centers during antepartum, intraparum or postpartum period based on provincial and national guidelines (Department of Health, 2007a).

Self-referred maternity patients: Patients who were not referred from the primary health care clinics and community health centers during their pregnancy based on provincial and national guidelines (Department of Health, 2007a).

LIST OF ABBREVIATIONS

ANC	Ante Natal Clinic
CHC	Community Health Centers
CS	Caesarean section
Dr. RSM	Dr Ruth Segomotsi Mompati District
IQR	Inter quartile range
MGD	Millennium Development Goals
PHC	Primary Health Care
PIH	Pregnancy Induced Hypertension
PNC	Postnatal Clinic
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to compare maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital. 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

All over the world, the district model is recommended as the preferred model for maternal healthcare delivery. The WHO recommends that there should be at least four facilities offering basic emergency care and one facility offering comprehensive emergency obstetric care within a health district of 500,000, the WHO recommends (WHO. 2009).

The South African Department of Health adopted a similar model. The community health centres (CHC) and fixed and mobile primary health care (PHC) facilities offer basic maternity care, whereas district and regional hospitals are expected to offer comprehensive maternity care (Figure 1.1). Pregnant patients are supposed to access antenatal services at their nearest clinics and, if a doctor's opinion is required, then patients can be referred to CHCs. Patients requiring normal deliveries are expected to be delivered at the CHCs (managed by professional nurses and midwives), whereas complicated cases are referred to either a district hospital (managed by generalist doctors) or a regional or tertiary hospital (managed by specialist doctors), if they require specialist intervention. Ideally, each health district should have a regional hospital whereas each health sub-district should have a district hospital and few CHCs where delivery should take place based on the nature of complexity (Department of Health, 2007a).

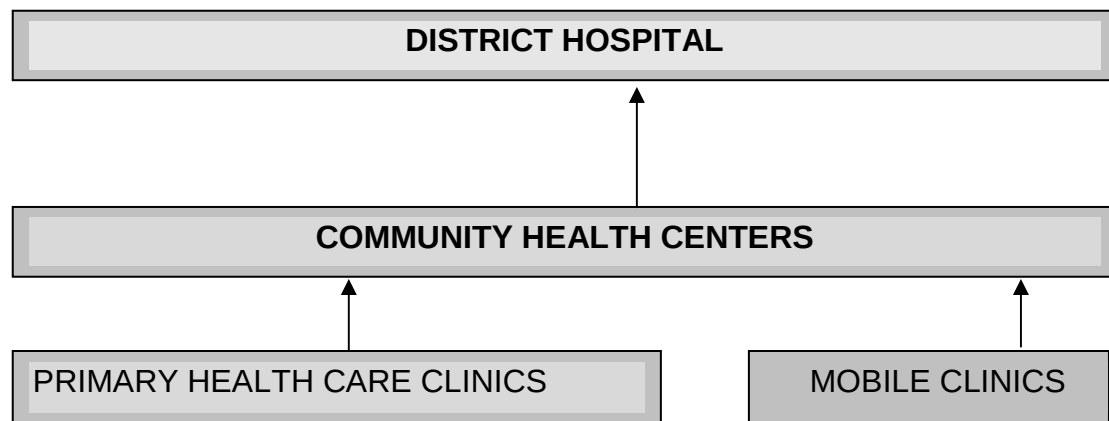


Figure 1.1 Referral network for the health sub-district

1.2 STATEMENT OF THE PROBLEM

The Ganyesa District Hospital is situated in the Dr Ruth Segomotsi Mompati District in the North West Province. Although the infrastructure is poorly developed in this rural district, the public health services are fully functional including a maternity unit at the Hospital. There are five CHCs referring directly to the Hospital. In addition, there are peripheral fixed clinics referring to the CHCs and mobile stations providing outreach services to the farm areas and communities that have limited access to these clinics. Antenatal check-ups are routinely done at the PHC clinics and uncomplicated deliveries are expected to be performed at CHCs. Complicated cases that would require m attention by medical doctors are expected to be referred to the Ganyesa District Hospital (Department of Health, 2007a). The performance indicators for obstetrics services in the Hospital are listed in Table 1.1.

Table 1.1 Ganyesa Hospital indicators for obstetric services

	2006/07	2007/08	2008/09
Number of beds allocated	12	15	15
Total Admissions	672	784	820
Average length of stay (days)	5	4	4
Bed occupancy rate	72%	83%	87%
Number of normal deliveries	534	587	598
Caesarean section rate	24%	38%	34%
Number of fresh still births	18	23	9
Number of macerated still births	14	28	15
Number of maternal deaths	2	1	4
Number of neonatal deaths	32	51	24

The above figures show that the Hospital has an increasing number of admissions and bed occupancy rates, high caesarean section rates and significant numbers of maternal and neonatal deaths. This raises concerns about the maternity services offered in this Hospital.

1.3 JUSTIFICATION OF THIS STUDY

Maternal health care in South Africa is based on the District Health System model which includes public health facilities (such as primary health care clinics, community health centers and district hospitals) as well as private health facilities. The majority of uncomplicated deliveries are expected to happen at CHCs and only complicated cases are expected to be referred to district hospitals. But, the district statistics showed that the majority of deliveries in the Dr Ruth Segomotsi Mompati District happen in district hospitals such as the Ganyesa District Hospital. Although the referral system for maternity patients is well-developed in the District, the number of deliveries is steadily increasing (from 534 in 2006/7 to 675 in 2008/9) at this Hospital. The monthly indicators for the maternity unit in the Ganyesa District Hospital showed a high caesarean section rate (34% in 2008/9) (above the identified district target of 11%) and a high maternal mortality ratio (200 per 100 000 in 2008/9). However, there was no increase in annual resources allocated to the Hospital (finance, material and human resources) during the last three years. There is a perception that the increase in the number of deliveries and

decrease in quality of services (such as high caesarean section, neonatal mortality rate and maternal mortality rates) are due to an increasing number of self-referred patients who bypass the referral system and come straight to the Hospital. However, no formal study has been done to systematically evaluate the current situation and to develop a better understanding of the impact of the increasing number of maternity patients. This study analysed the routinely collected data in an attempt to improve maternity services within the Hospital and the District.

1.4 RESEARCH QUESTION

What are the differences in the maternal and neonatal profiles and outcomes between referred and self-referred patients delivered at the Ganyesa District Hospital during the study period (1st April 2008 to 31st March 2009)?

1.5 STUDY OBJECTIVES

1.5.1 BROAD OBJECTIVE

To compare the pregnancy outcomes (maternal and neonatal profiles and outcomes) between referred and self-referred patients delivered at the Ganyesa District Hospital during the study period (1st April 2008 to 31st March 2009)

1.5.2 SPECIFIC OBJECTIVES

1. To determine the profile (Socio-demographic and clinical) of mothers (referred and self-referred) who delivered at the Maternity Unit during the study period
2. To determine referral status and associated factors (Geographical distance, reasons for referral, time of referral, transport)
3. To compare the profiles and outcomes between referred and self-referred mothers

1.6 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 are described below.

Chapter Two: Literature Review: The purpose of the literature review is to review pertinent literature and to discuss concepts related to the maternity services with particular reference to antenatal booking at district hospitals in South Africa and elsewhere.

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

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

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

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

CHAPTER 2

REVIEW OF LITERATURE

In this chapter, relevant literature into the maternal health services with particular reference to referral of pregnant mothers are discussed. In addition to published literature, information from various unpublished sources is also reviewed.

2.1 MATERNAL HEALTH SERVICES

Maternal and child health services have been identified as priority programs throughout the world. These programs are monitored in various countries through the Millennium Development Goals (MDGs). The member states of the World Health Organization (WHO) have made a commitment for achievement of the targets by 2015. The WHO is also using these priority programs to measure the level of development in health services of member countries (WHO, 2007). Although progress has been made in reducing maternal and child mortality, it appears unlikely that the target will be met by 2015 in many countries, particularly those from sub-Saharan Africa (UNO, 2008). South Africa has also adopted these goals as a priority and has developed indicators for monthly monitoring and evaluation in order to improve maternal and child health services.

More than a decade after the introduction of democracy in 1994, South Africa has one of the most progressive and comprehensive reproductive health policies and laws in the world but this has not translated to improvement of maternal health services in the country (Cooper, Morroni, Orner, et al., 2004).

In the South African context, the concept of the MDGs has been adopted at national and provincial levels, and interventions were developed in line with improving child and maternal health services in order to reduce perinatal and maternal mortality. The WHO Guidelines for saving mothers have been

developed to be followed by all institutions offering maternal health services. The report indicated that 38.4% of the deaths were due to avoidable factors, including poor transport, lack of health facilities, and lack of appropriately trained staff (Department of Health, 2007b) which were similar to the previous reports (Department of Health, 1999). This shows that there has been very little progress in South Africa regarding improvement of maternal and child health services in terms of improvement of administrative factors which might be able to reduce maternal mortality and morbidity. Similarly, 'Saving babies report' identified factors associated with perinatal mortality and morbidity (Department of Health, 2008)

Tlebere, Jackson, Loveday, et al. (2007) suggested the following factors might have an impact on utilization of maternal health services in South Africa: (1) transport and distance to care, particularly in rural areas; (2) poor providers' communication with families. However, they found that health-seeking behaviour was better than anticipated.

2.2 MATERNAL REFERRAL SYSTEM

A well-functioning referral system is a necessary element of successful safe motherhood programmes in developing countries. It is an essential component of a district health system. A good maternal referral system provides essential access to emergency obstetric care and supports antenatal and delivery care in first line facilities such as PHC clinics and CHCs (Jahn and De Brouwere, 2001).

Murray and Pearson (2006) suggested 'a successful maternity referral system should include following: (a) a referral strategy based on the assessment of population needs and health system capabilities (b) a well resourced referral centre; (c) active collaboration among different levels of health facilities (d) formalised communication and transport arrangements among these facilities (e) specific protocols for referrer and receiver; (e) supervision and accountability for providers' performance; (f) affordable service costs; (g) the

capacity to monitor effectiveness; and (h) underpinning all of these, policy support'.

In South Africa, the district health system prescribes that all antenatal care patients except complicated cases (such as previous caesarean section, medical disorders in pregnancy) must be managed by professional nurses at primary health care clinics. When a patient's health problem cannot be managed at the clinic level, that patient may be referred to the community health centre normally visited or staffed with a permanent medical officer. A patient must only be referred to a district hospital when health problems can not be managed at this level (Couper and Hugo, 2007). The referral system in the Dr Ruth Segomotsi Mompati District is similar to the pattern elsewhere in South Africa. However, patients often bypass the clinics and CHCs and come straight to the Ganyesa District Hospital

Jahn, et al (2001) observed that the actual use of a referral system for obstetric care in developing countries was inversely related to the risk of complications. This implies that there is a large difference between the proportion of pregnant women being identified as "at risk" and those who actually attend referral level care. They found in referral hospitals, self-referral for delivery were often without specific medical reasons. This form of referrals (self-referrals) was the most common mode of referral, while institutional referral was less frequent and emergency referral was very rare. This pattern was found in a rural district Tanzania (Jahn and Kowalewski, 1998), a teaching hospital in Ghana (Nkyekeyer, 2000), as well as a rural district in Nepal (Jahn, Dar Lang, Shah, et al, 2000). For example, Jan et al (1998), reported in a rural district in Tanzania, self-referrals constitute more than 70%, institutional referral around 30% and emergency referral less than 5% of women at referral level. Nkyekeyer (2000) found 82% self referrals and 2% emergencies among hospital deliveries in a teaching hospital in Ghana.

The following factors have been identified that might have an influence on referral systems (Jahn, et al, 2001): (a) distance, (b) cost, (c) perceived quality of obstetric care, (d) health workers attitude and (e) respect for women's

social needs, (f) perceived aetiology of complications and socio-cultural preferences. It is not known if these factors also influence the maternal referral system in South Africa. More research is required to determine how maternity referral system can be improved so that the majority of the women deliver at the CHCs.

2.3 IMPACT OF REFERRAL SYSTEM ON RESOURCE UTILIZATION

Resource utilization is one of the major decisions to be taken by the hospital executives to ensure appropriate expenditure and proper use of resources. There are several indicators that can be utilized in an obstetric unit to measure effective use of resources. Efficiency indicators, such as the length of stay, are the measures that can be used to determine whether resources are used effectively (Eriksen, Kristiansen, Nord, et al., 1999). Inappropriate admissions often contribute to inappropriate use of resources, resulting in unplanned expenditure in hospitals. This resulted in limited benefits for appropriate patients of these institutions. (Jankowski, 1993). The Ganyesa District Hospital is a level one hospital that provides the core package of level one service. It is supposed to receive referred patients from the CHCs but this is often flouted because of self-referrals and the departmental policies of open access. This results in increased costs for medications and other supplies that could be avoided. It is therefore important that the referral system should be well-coordinated and implemented in line with the agreed upon provincial and national criteria (Department of Health, 2007a).

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 a retrospective record review conducted at a district hospital in the North West Province.

3.2 STUDY SETTING

The study setting was the Obstetric unit of the Ganyesa District Hospital, situated in the Dr. Ruth Segomotsi Mompati District in the southern part of the North West Province.

Dr. Ruth Segomotsi Mompati District

Dr. Ruth Segomotsi Mompati District (formerly Bophirima District Municipality) is one of the four districts of North West province of South Africa. The seat of Mompati District is Vryburg. The majority of its 439,637 people speak Setswana (2001 Census). More than 50% of the population (229,254, 52.15%) is female. Majority of them are black (405,675, 92%). Approximately third of the population (32%) is in the reproductive age group (15 to 45 years of age).

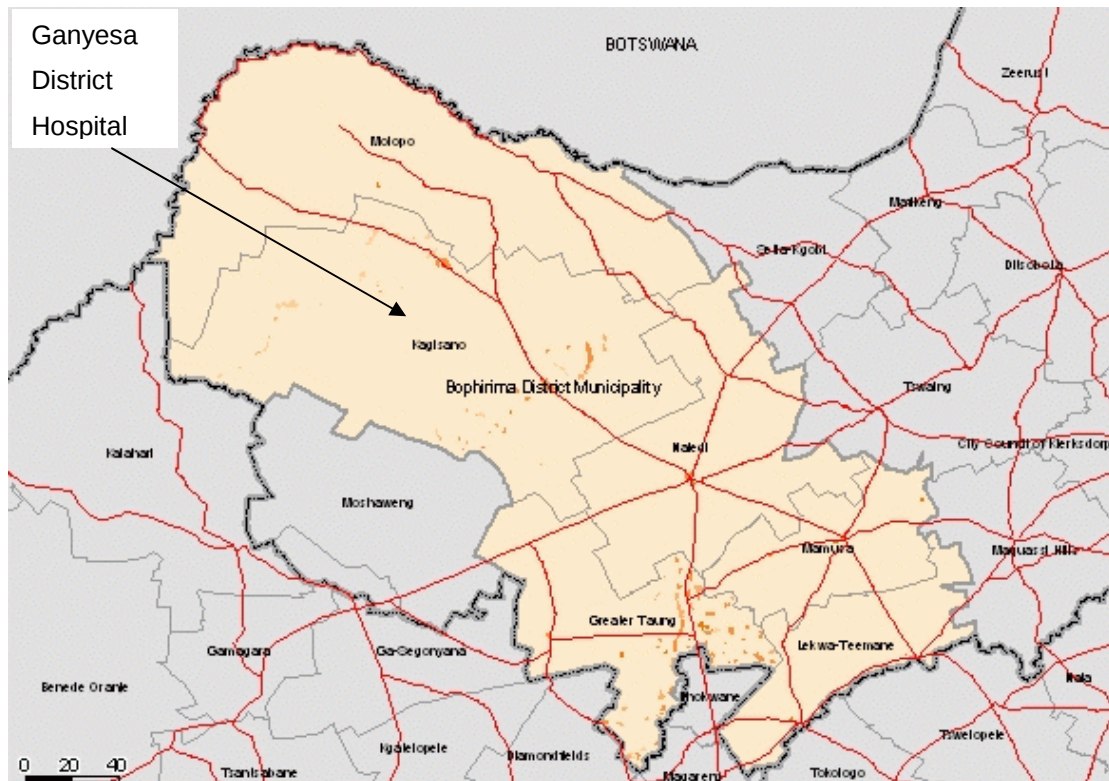


Figure 3.1 Dr. Ruth Segomotsi Mompoti District

There are five sub-districts within the District: Greater Taung, Kagisano, Naledi, Mamusa, Lekwa-Teemane and Molopo. Each of the five sub-districts in the District has a district hospital, few community health centers (CHC) and a number of primary health care (PHC) clinics. Mobile clinics are used to access the farm areas and those villages without fixed clinics. There is no regional hospital in the District.

Ganyesa District Hospital

Ganyesa District Hospital is situated at Ganyesa in the Kagisano Health sub-District. The Hospital is a 60-bed institution with 15 beds allocated for obstetric services. The activities of the unit include antenatal care, delivery (including assisted delivery and caesarean section) and postnatal care. There are six midwives and six auxiliary nurses and one doctor working in the Unit.

3.3 STUDY SCOPE

This study involved retrospective records review of routinely collected data from the Hospital Information System. No primary data collection was done for this study. No intervention was done as a part of this study.

3.4 STUDY PERIOD

The study period was one year from 1st April 2008 to 31st March 2009.

3.5 STUDY POPULATION AND SAMPLING

The study population comprised all the patients who delivered at the Maternity Unit of the Hospital during the study period. The entire study population was included in the study. Therefore, no sampling was done.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data were extracted from the Hospital Information System which records detailed information about the profiles and outcomes of patients who deliver at the Ganyesa District Hospital. Besides the Hospital Information System, the Maternity Unit also keeps manual records of patients admitted and delivered in the Unit.

3.6.2 STUDY INSTRUMENT

The data used for this study were extracted from the Hospital Information System to MS Excel using the tools designed for this study (Appendix B).

3.6.3 VARIABLES

Variables used in this study are listed below.

- Demographic characteristics (Age, Ethnicity, Marital status, Employment status, Occupation, Place of residence)
- Clinical: Maternal (Parity, Past medical history, Ante-partum diseases, Mode of delivery, Reasons for caesarean sections), and Neonatal (Birth weight, Apgar score) and Length of stay
- Referral (Source of referral, Geographical distance, Reasons for referral and time and transport)

The following new variables were created:

- Geographical distance- The nearest clinics were identified from the Dr. Ruth Segomotsi Mompati District office. Geographical distance between place of residence and (i) nearest PHC and (ii) Ganyesa District Hospital were calculated using the information available at the Dr. Ruth Segomotsi Mompati District office.
- Staff to patient ratio- The staff to patient ratio was calculated based on the ratio between the number of patients seen per month and the staff working during the period.

3.6.4 DATA ANALYSIS

The data was captured in the MS Excel based spreadsheets (Appendix B). Then data was then cleaned by looking at missing entry or any error. Subsequently, data was exported to NCSS software for analysis (NCSS, 2007).

The following descriptive statistics were reported:

- Continuous variables (not normally distributed): median and inter-quartile range, and
- Nominal and ordinal variables (such as ethnicity): proportions.

A comparative analysis was done between referred and self-referred patients using following statistical tests:

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

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

3.7 PILOT STUDY

No pilot study was done as the data to be used for this study is routinely collected.

3.8 ETHICAL CONSIDERATIONS

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

CHAPTER 4

RESULTS

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

4.1 STUDY POPULATION

The study population consisted of 599 patients who delivered at the Hospital during the study period. Four hundred forty nine (75%) of them were referred (Table 4.1). One hundred and forty nine (25%) patients presented themselves without being referred from any source.

Table 4.1 Referral source

Referral source	Total n (%)
Mobile clinic	2 (0.4%)
PHC clinic	31 (6.9%)
Community Health Centre	394 (87.8%)
Private practioners	22 (4.9%)
Total	450 (100%)

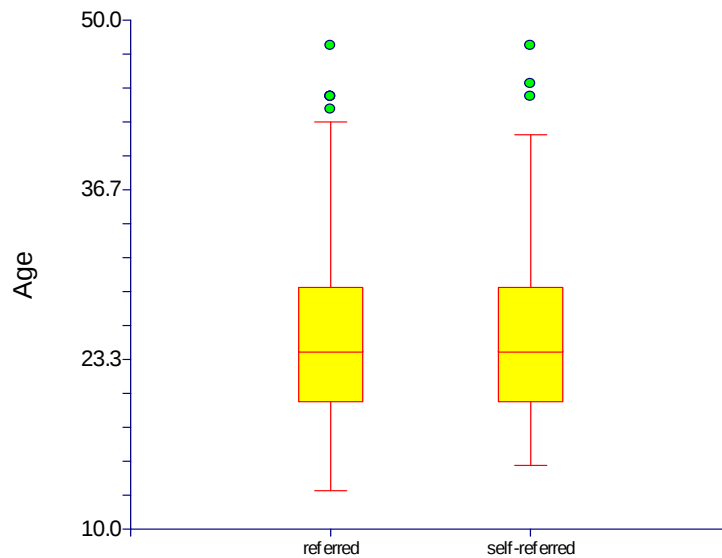
4.2 SOCIO-DEMOGRAPHIC PROFILES OF PATIENTS

4.2.1 AGE

The distribution of age of the subjects is presented in Table 4.2 (Figure 4.1). As age is not normally distributed, median and IQR were calculated. There were no significant differences in age between the referred and self-referred patients (Mann Whitney's U test, $p = 0.60$).

Table 4.2 Age distribution of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	24 (20-29)	24 (20-29)	24 (20-29)
Range	13 to 48	13 to 48	15 to 48

**Figure 4.1 Box-plot for age (in years)**

4.2.2 ETHNICITY

The ethnicity of the subjects is presented in Table 4.3. The majority of the subjects were black.

Table 4.3 Ethnicity of the subjects

	Total	Referred	Self-referred
Black	594 (99.3%)	445 (99.1%)	149 (100%)
Indian	2 (0.3%)	2 (0.4%)	0
Coloured	1 (0.2%)	1 (0.2%)	0
White	1 (0.2%)	1 (0.2%)	0
Total	598 (100%)	449 (100%)	149 (100%)

4.2.3 MARITAL STATUS

The marital status of the subjects is presented in Table 4.4. The majority of the subjects were single. There were no significant differences in marital status between the two groups (Chi-square test, $p = 0.58$).

Table 4.4 Marital status of the subjects

	Total	Referred	Self-referred
Married	49 (8.2%)	35 (7.8%)	14 (9.4%)
Divorced	6 (1%)	6 (1.3%)	0
Widow	7 (1.2%)	5 (1.1%)	2 (1.3%)
Single	515 (86.1%)	384 (85.9%)	129 (86.6%)
Minor	21 (3.5%)	17 (3.8%)	4 (2.7%)
Total	598 (100%)	449 (100%)	149 (100%)

4.2.4 EMPLOYMENT STATUS

The employment status of the subjects is presented in Table 4.5. The majority of the subjects were unemployed. There were no significant differences in employment status between the two groups (Chi-square test, $p = 0.87$).

Table 4.5 Employment status of the subjects

	Total	Referred	Self-referred
Employed	18 (3%)	14 (3.1%)	4 (2.7%)
Minor	21 (3.5%)	15 (3.3%)	6 (4%)
Student	5 (0.8%)	4 (0.9%)	1 (0.7%)
Unemployed	553 (92.6%)	415 (92.6%)	138 (92.6%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3 OBSTETRIC PROFILE OF PATIENTS

4.3.1 MATERNAL

4.3.1.1 GRAVIDITY

The distribution of gravidity of the subjects is presented in Table 4.6 (Figure 4.2). As gravidity is not normally distributed, median and IQR were calculated. There were no significant differences in gravidity between the referred and self-referred patients (Mann Whitney's U test, $p = 0.60$).

Table 4.6 Gravidity of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	2 (1-3)	2 (1-3)	2 (1-3)
Range	1 to 7	1 to 7	1 to 6
GRAVIDITY			
1	238 (39.9%)	179 (39.9%)	59 (39.9%)
2 to 5	353 (59.1%)	265 (59%)	88 59.5%
More than 5	6 (1%)	5 (1.1%)	1 (0.7%)

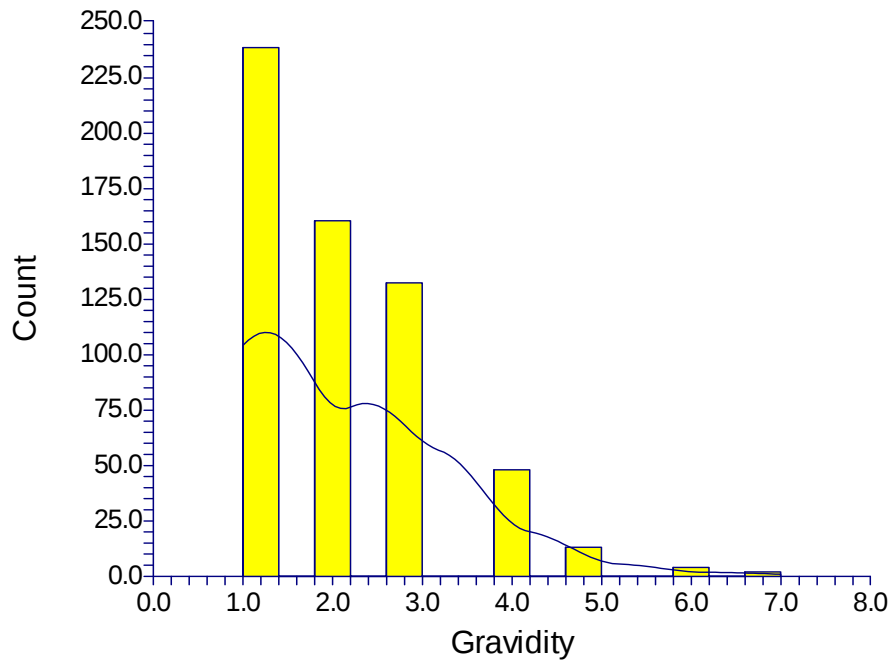


Figure 4.2 Gravidity of the subjects

4.3.1.2 PAST MEDICAL DISORDERS

The past medical disorders of the subjects are presented in Table 4.7. There were no significant differences in prevalence of past medical disorders between the referred and self-referred patients (Chi-square test, $p=0.11$).

Table 4.7 Past medical history of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
PTB	3 (0.5%)	1 (0.2%)	2 (1.3%)
Asthmatic	2 (0.3%)	1 (0.2%)	1 (0.7%)
Diabetic	16 (2.7%)	11 (2.4%)	5 (3.4%)
Hypertensive	2 (0.3%)	2 (0.4%)	0
Mental	9 (1.5%)	6 (1.3%)	3 (2%)
Renal	3 (0.5%)	1 (0.2%)	2 (1.3%)

4.3.1.3 ANTE-PARTUM DISEASES

The ante-partum disorders of the subjects are presented in Table 4.8. There were no significant differences in prevalence of ante-partum diseases between the referred and self-referred patients (Chi-square test, $p=0.08$).

Table 4.8 Past medical history of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
PIH	13 (2.2%)	11 (2.4%)	2 (1.3%)
Generalised oedema	2 (0.3%)	0	2 (1.3%)
Proteinuria	6 (1%)	5 (1.1%)	1 (0.7%)
Urinary Tract Infection	3 (0.5%)	1 (0.2%)	2 (1.3%)
Anaemia	2 (0.3%)	2 (0.4%)	0
Poor weight gain	6 (1%)	5 (1.1%)	1 (0.7%)
TB	1 (0.2%)	0	1 (0.7%)
Poly-hydramnios	7 (1.2%)	5 (1.1%)	2 (1.3%)

4.3.1.4 TERM AND PRE-TERM DELIVERY

The prevalence of pre-term deliveries of the subjects is presented in Table 4.9. There were no significant differences in prevalence of pre-term deliveries between the two groups (Chi-square test, $p = 0.65$).

Table 4.9 Pre-term deliveries among the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Pre-tem	89 (14.8%)	68 (15.1%)	20 (13.6%)
Term	509 (85.2%)	381 (84.9%)	129 (86.4%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3.1.5 MODE OF DELIVERY

The mode of deliveries of the subjects is presented in Table 4.10. There were no significant differences in terms of mode of deliveries between the two groups (Chi-square test, $p = 0.23$).

Table 4.10 Pre-term deliveries among the subjects

	Total	Referred	Self-referred
Normal vaginal delivery	517 (86.5%)	394 (87.8%)	123 (82.6%)
Caesarean section	79 (13.2%)	54 (12%)	25 (16.8%)
Vacuum	2 (0.3%)	1 (0.2%)	1 (0.7%)
Total	598 (100%)	449 (100%)	149 (100%)

4.3.1.6 CAESAREAN SECTION

The study found no significant association between types of CS and referral (Chi-square test, $p = 0.42$) (Table 4.11).

Table 4.11 Type of caesarean section

	Total	Referred	Self-referred
Elective	23 (29.1%)	13 (25.9%)	9 (36%)
Emergency	56 (70.9%)	41 (74.1%)	16 (64%)
Total	79 (100%)	54 (100%)	25 (100%)

The indications for caesarean sections are presented in Table 4.12. There were no significant differences in terms of mode of deliveries between the two groups (Chi-square test, $p = 0.88$). The pregnancy induced hypertension (PIH) and previous CS were common maternal indications whereas fetal distress and mal-presentation were common fetal indications.

Table 4.12 Pre-term deliveries among the subjects

	Total	Referred	Self-referred
PIH	18 (22.8%)	13 (24.1%)	5 (20%)
APH	2 (2.5%)	1 (1.9%)	1 (4%)
PROM	1 (1.3%)	1 (1.9%)	0
CPD	3 (3.8%)	3 (5.6%)	0
Previous CS	9 (11.4%)	5 (9.3%)	4 (16%)
Prolonged 1st stage	1 (1.3%)	1 (1.9%)	0
Prolonged 2nd stage	4 (5.1%)	2 (3.7%)	2 (8%)
Mal-presentation	19 (24.1%)	13 (24.1%)	6 (24%)
Multiple pregnancy	3 (3.8%)	1 (1.9%)	2 (8%)
Fetal distress	19 (24.1%)	14 (25.9%)	5 (20%)
Total	79 (100%)	54 (100%)	25 (100%)

4.3.1.7 COMPLICATIONS AT DELIVERY

The intra-partum complications at delivery are described in Table 4.13. There were 41 (9%) complications among the referred patients in comparison to 10% among the self-referred patients. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications, There were no significant differences in terms of intra-partum complications between the two groups (Chi-square test, $p = 0.67$).

Table 4.13 Intra-partum complications among the subjects

	Total	Referred	Self-referred
Eclampsia	2 (3.5%)	2 (4.9%)	0
Intra-partum haemorrhage	10 (17.5%)	8 (19.5%)	2 (12.5%)
Precipitate labour	5 (8.8%)	4 (9.8%)	1 (6.3%)
Prolonged labour	17 (29.8%)	13 (31.7%)	4 (25%)
Offensive liquor	1 (1.8%)	1 (2.4%)	0
Fetal distress	6 (10.5%)	4 (9.8%)	2 (12.5%)
Fresh still birth	8 (14%)	5 (12.2%)	3 (18.8%)
Failure to diagnosis mal-presentation	2 (3.5%)	0	2 (12.5%)
cord prolapse	6 (10.5%)	4 (9.8%)	2 (12.5%)
Total	57 (100%)	41 (100%)	16 (100%)

4.3.1.8 POST-PARTUM COMPLICATIONS

The post-partum complications at delivery are described in Table 4.14. There were 21 (4.6%) post-partum complications among the referred patients in comparison to 3.3% among the self-referred patients. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were no significant differences in terms of intra-partum complications between the two groups (Chi-square test, $p = 0.20$).

Table 4.14 Intra-partum complications among the subjects

	Total	Referred	Self-referred
PIH	11 (42.3%)	10 (47.6%)	1 (20%)
PPH	7 (26.9%)	4 (19%)	3 (60%)
Postpartum anaemia	4 (15.4%)	4 (19%)	0
Gaping episiotomy	2 (7.7%)	1 (4.8%)	1 (20%)
Secondary suturing	2 (7.7%)	2 (9.5%)	0
Total	26 (100%)	21 (100%)	5 (100%)

4.3.1.9 MATERNAL OUTCOME

The maternal outcomes are described in Table 4.15. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/100,000) which is of concern. There were no significant differences in terms of maternal outcome between the two groups (Chi-square test, $p = 0.23$).

Table 4.15 Intra-partum complications among the subjects

	Total	Referred	Self-referred
Death	3 (0.5%)	3 (0.7%)	0
Discharged	586 (98.2%)	441 (98.2%)	145 (97.3%)
Referred to regional hospital	9 (1.5%)	5 (1.1%)	4 (2.7%)
Total	598 (100%)	449 (100%)	5 (100%)

4.3.2 PERINATAL

4.3.2.1 BIRTH WEIGHT

The distribution of birth weight of the subjects is presented in Table 4.16 (Figure 4.1). As birth weight is not normally distributed, median and IQR were calculated. There were no significant differences in birth weight between the referred and self-referred patients (Mann Whitney's U test, $p = 0.11$). The incidence of low birth weight (less than 2.5 kg) was 23% (105, 23% among referred and 38, 25% among self-referred patients).

Table 4.16 Birth weight of the subjects

Birth weight in kg	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	3 (2.6 – 3.4)	3 (2.6-3.4)	2 (2-3)
Range	1.4 to 3.9	1.4 to 3.9	1.4 to 3.8

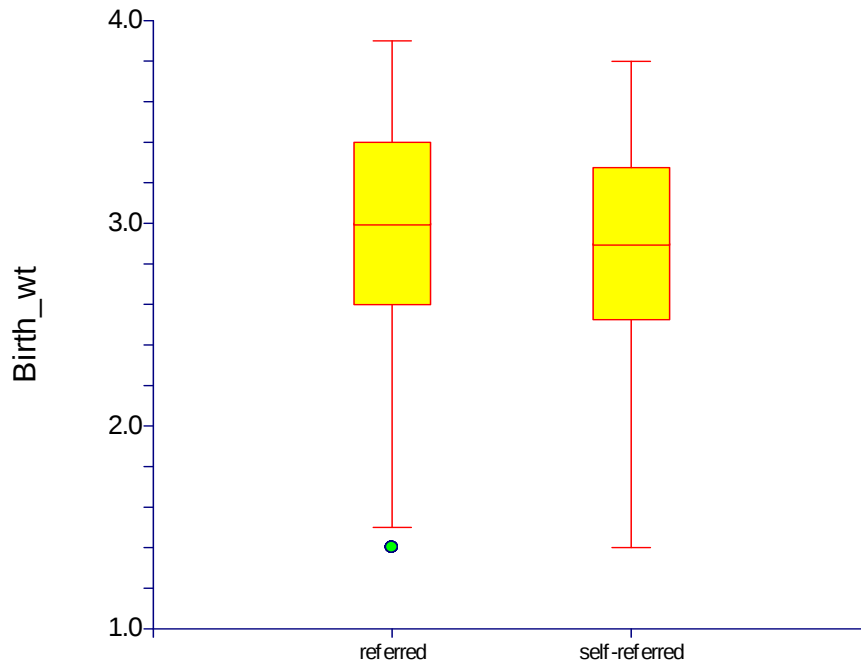


Figure 4.3 Box-plot for birth weight (in kg)

4.3.2.2 APGAR SCORE

The distribution of Apgar scores of the subjects is presented in Table 4.17. As Apgar score is not normally distributed, median and IQR were calculated. There were no significant differences in Apgar scores at 1 minute and 10 minutes between the referred and self-referred patients (Mann Whitney's U test, $p = 0.11$).

Table 4.17 Birth weight of the subjects

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Apgar score- 1 minute			
Median (IQR)	8 (7-9)	8 (7-9)	8 (7-9)
Range	(0 to 10)	(0 to 10)	(0 to 10)
Apgar score- 10 minutes			
Median (IQR)	10 (9 -10)	10 (9 -10)	10 (9 -10)
Range	0 to 10	0 to 10	0 to 10

4.3.2.3 PERINATAL COMPLICATIONS

The perinatal complications are described in Table 4.18. There were 31 (6.9%) complications among the referred patients in comparison to 13 (8.7%) among the self-referred patients. The fresh and macerated stillbirths and low Apgar score were common neonatal complications. There were no significant differences in terms of neonatal complications between the two groups (Chi-square test, $p = 0.47$).

Table 4.18 Perinatal complications

	Total	Referred	Self-referred
Macerated still birth	11 (23.9%)	8 (23.5%)	3 (25%)
Fresh still birth	12 (26.1%)	10 (29.4%)	2 (16.7%)
Low Apgar score (1-5)	8 (17.4%)	8 (23.5%)	0
Abnormities	4 (8.7%)	2 (5.9%)	2 (16.7%)
Asphyxiated	2 (4.3%)	1 (2.9%)	1 (8.3%)
Aspirated	4 (8.7%)	3 (8.8%)	1 (8.3%)
Jaundice	1 (2.2%)	0	1 (8.3%)
Low birth weight (less than 1 kg)	1 (2.2%)	0	1 (8.3%)
Pyrexia	2 (4.3%)	2 (5.9%)	0
Swollen face	1 (2.2%)	0	1 (8.3%)
Total	44 (100%)	31 (100%)	13 (100%)

4.3.2.4 PERINATAL OUTCOMES

The perinatal outcomes are described in Table 4.19. There were no significant differences in terms of perinatal outcomes between the two groups (Chi-square test, $p = 0.20$).

Table 4.19 Perinatal outcomes

	Total	Referred	Self-referred
Macerated still birth	12 (1.8%)	10 (1.8%)	2 (2%)
Fresh still birth	11 (2%)	8 (2.2%)	3 (1.3%)
Neonatal death	9 (1.5%)	6 (1.3%)	3 (2%)
Discharged	566 (94.6%)	425 (94.7%)	141 (94.6%)
Total	598 (100%)	449 (100%)	149 (100%)

The perinatal mortality rate during this period was 53 per 1000 births.

4.3.3 LENGTH OF STAY (DAYS)

The distribution of length of stay of the subjects is presented in Table 4.20 (Figure 4.4). As length of stay is not normally distributed, median and IQR were calculated. There were no significant differences in length of stay between the referred and self-referred patients (Mann Whitney's U test, $p = 0.40$).

Table 4.20 Length of stay (in days)

	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	2 (2-3)	2 (2-3)	2 (2-3)
Range	1 to 14	1 to 14	1 to 8

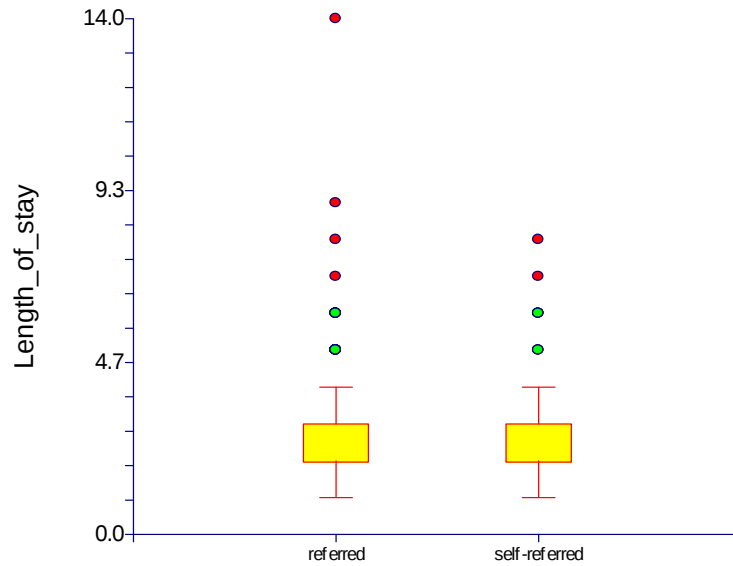


Figure 4.4 Box-plot for length of stay (in days)

4.4 REFERRAL

4.4.1 TIME OF ARRIVAL

The study found a significant association between time of arrival and referral (Chi-square test, $p < 0.01$) (Table 4.21). More referred patients arrived after hours in comparison to self-referred patients.

Table 4.21 Time of arrival

	Total	Referred	Self-referred
After hours	374 (62.5%)	302 (67.3%)	72 (48%)
Working hours	224 (37.5%)	147 (32.7%)	77 (52%)
Total	598 (100%)	449 (100%)	149 (100%)

4.4.2 TRANSPORT

The study found a significant association between type of transport used and referral (Chi-square test, $p < 0.05$) (Table 4.22). More referred patients arrived with ambulance in comparison to self-referred patients.

Table 4.22 Transport

	Total	Referred	Self-referred
Ambulance	522 (87.3%)	399 (88.7%)	124 (83.3%)
Public transport	2 (0.4%)	0	2 (1.4%)
Private transport	10 (1.7%)	8 (1.7%)	2 (1.4%)
Self transport	63 (10.6%)	43 (9.5%)	21 (13.9%)
Total	598 (100%)	449 (100%)	149 (100%)

4.4.3 DISTANCE BETWEEN PLACE OF RESIDENCE AND PHC FACILITIES

The distribution of distance between places of residence and PHC facilities (Clinic and CHC) is presented in Table 4.23 (Figure 4.5). As the distance is not normally distributed, median and IQR were calculated. There were significant differences in the distances from places of residences to nearby health facilities between the referred and self-referred patients (Mann Whitney's U test, $p = 0.04$). The residences of referred patients were farther from the PHC facilities than the self-referred patients.

Table 4.23 Distance between places of residence and PHC facilities

Distance in km	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	12 (10-18)	13 (11-19)	7 (6-16.5)
Range	3 to 35	3 to 35	3 to 35

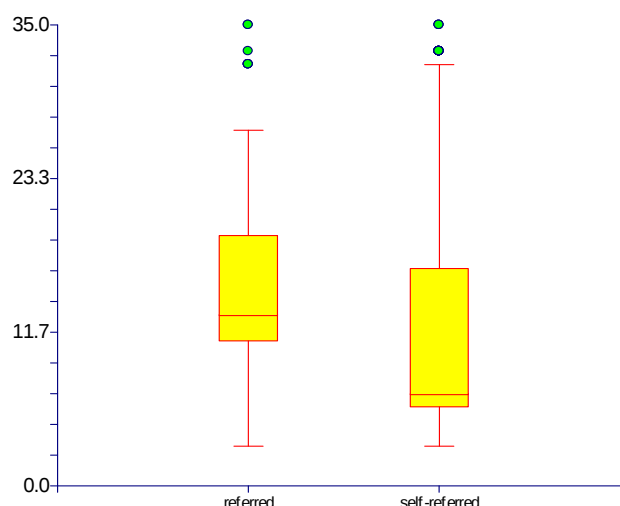


Figure 4.5 Box-plot for distance between places of residences and nearest PHC facilities (in km)

4.4.4 DISTANCE BETWEEN PLACE OF RESIDENCE AND THE HOSPITAL

The distribution of distance between places of residence and the Hospital is presented in Table 4.24 (Figure 4.6). As the distance is not normally distributed, median and IQR were calculated. There were significant differences in the distances from places of residences and the Hospital between the referred and self-referred patients (Mann Whitney's U test, $p < 0.03$). The residences of referred patients were farther away from the Hospital than the self-referred patients.

Table 4.24 Distance between places of residence and the Hospital

Distance in km	Total (n=598)	Referred (n=449)	Self-referred (n= 149)
Median (IQR)	45 (30-70)	45 (32-70)	40 (24-70)
Range	5 to 232	5 to 155	5 to 232

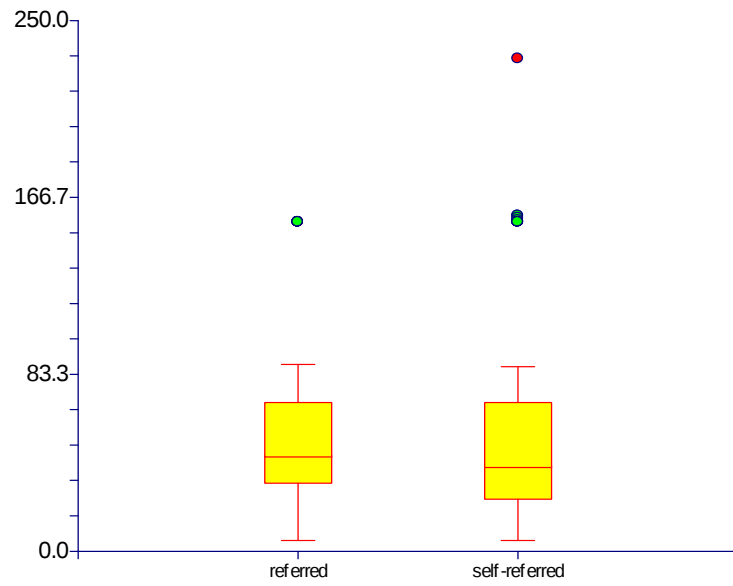


Figure 4.6 Box-plot for distance between places of residences and the Hospital (in km)

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

This study was done in order to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred who delivered at a district hospital (Ganyesa District Hospital) during one year study period (1st April 2008 to 31st March 2009). No study had been conducted at the level of a district hospital in the North West Province to look at the influence of referral status on pregnancy outcomes.

The study population consisted of 599 patients who delivered at the Hospital during the study period. Four hundred forty nine (75%) of them were referred. One hundred and forty nine (25%) patients presented themselves without being referred from any source which was lower than the self-referral rate in Tanzania (70%) (Jan et al, 1998), and in Ghana (82%) (Nkyekeyer, 2000). This is probably better health care system in the District than in other parts of Africa.

5.2 SOCIO-DEMOGRAPHIC PROFILES

The median age was 24 years. There were no significant differences in age between the referred and self-referred patients. The majority of the subjects were black, which is the predominant ethnic group in the area (Municipal Demarcation Board, 2010). Most of the patients were single and unemployed. There were no significant differences in marital and employment status between the two groups. This study could not find any association between the socio-demographic profiles and referral status of the patients.

5.3 OBSTETRIC PROFILE OF PATIENTS

5.3.1 MATERNAL

The majority of the patients were multigravidae. The most common past and current medical disorders were diabetes and pregnancy induced hypertension (PIH), which is one of the common pregnancy associated medical conditions. The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally followed by CS. The majority of CS were performed as an emergency. The pregnancy induced hypertension (PIH) and previous CS were common as maternal indications whereas fetal distress and mal-presentation were common as fetal indications. Prolonged labour and Intra-partum haemorrhage were common intrapartum complications whereas fetal distress and fresh still-birth were common fetal complications. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000) which is of concern.

There were no significant differences in obstetric profiles (such as gravidity, past and present medical disorders, preterm deliveries, mode of deliveries maternal and perinatal complications and outcomes) between the referred and self-referred patients.

5.3.2 PERINATAL

The median birth weight was 3 kg. The incidence of low birth weight (less than 2.5 kg) was 23% (105, 23% among referred and 38, 25% among self-referred patients). Median Apgar scores at 1 and 10 minutes were 8 and 10 respectively. The fresh and macerated stillbirths and low Apgar score were common neonatal complications. The perinatal mortality rate during this period was 53 per 1000 births.

There were no significant differences in perinatal profiles and outcomes (such as birth weight, prevalence of low birth weight, still-birth and low Apgar score) between the referred and self-referred patients.

5.4 REFERRAL

There was a significant association between time of arrival and referral ($p < 0.01$). More referred patients arrived after hours in comparison to self-referred patients. This was interesting because the PHC clinics and CHC should refer more patients during working hours.

The majority of the patients arrived by ambulance (87.3%). There was a significant association between type of transport used and referral ($p < 0.05$). More referred patients arrived with ambulance in comparison to self-referred patients.

The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. There were significant differences in the distances between the referred and self-referred patients ($p = 0.40$). The residences of referred patients were farther from the PHC facilities than the self-referred patients. The median distance between places of residence and the Hospital was 45 km. There were significant differences in the distances between the referred and self-referred patients ($p < 0.03$). The residences of referred patients were farther from the Hospital than the self-referred patients. This suggests that patients who stayed farther away from the hospital goes to the PHC clinic and CHCs which was closer to their home than this Hospital. Therefore, they went to these PHC facilities, who then sent these patients to the Hospital by Ambulance. In contrast, self-referred patients stayed closer to this Hospital and therefore decided to come straight to the Hospital instead of going to nearby PHC facilities.

Tlebere, et al (2007) suggested transport and distance to care, particularly in rural areas played a major role on the utilization of maternal health services in South Africa. This study also found that the geographical distance (from the place of residences to nearby health facilities) was the only factor that had a significant association with referral status.

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 were 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 599 subjects who delivered at the Ganyesa Hospital, a district hospital in a rural district in the North West Province during one year study period. Four hundred forty nine (75%) of them were referred and 149 (25%) patients presented themselves without being referred from any source. The broad purpose of this study was to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred mothers who delivered at the Hospital during the study period.

6.1.1 DETERMINATION OF THE PROFILE OF PATIENTS

The median age of the subjects was 24 years. The majority of the subjects were black. Most of the patients were, single and unemployed.

The majority of the patients were multigravidae. The most common past medical disorders was diabetes. The most common antenatal disorder was pregnancy induced hypertension (PIH). The prevalence of pre-term deliveries of the subjects was 14.8%. The majority of the subjects delivered normally (86.5%) followed by CS (13.2%). The majority of CSs were performed as emergency. The PIH and previous CS were common maternal indications

whereas fetal distress and mal-presentation were common fetal indications. Prolonged labour and Intra-partum haemorrhage were common maternal complications whereas fetal distress and fresh still-birth were common fetal complications. There were 26 (4.3%) post-partum complications. The PIH and post-partum haemorrhage (PPH) were common maternal complications. There were 3 (4.6%) deaths during this period among the patients (Maternal mortality rate of 501/ 100,000).

The median birth weight was 3 kg. The incidence of low birth weight (less than 2.5 kg) was 23%. The median Apgar scores at 1 and 10 minutes were 8 and 10 respectively. The fresh and macerated stillbirths and low Apgar score were common neonatal complications.

The median length of stay was 2 days.

6.1.2 DETERMINATION OF REFERRAL STATUS

The majority of the patients (374, 62.5%) arrived after-hours. The majority of the patients arrived by ambulance (87.3%). The median distance between places of residence and PHC facilities (Clinic and CHC) was 12 km. The median distance between places of residence and the Hospital was 45 km.

6.1.3 COMPARISON OF THE PROFILES AND OUTCOMES BETWEEN REFERRED AND SELF-REFERRED MOTHERS

There were no significant differences in socio-demographic status between referred and self-referred patients.

There were also no significant differences in obstetric profiles (gravidity, prevalence of past medical disorders and antenatal disorders, prevalence of pre-term deliveries, mode of deliveries) between the two groups. There were no significant differences in terms of intra-partum or post-partum

complications and maternal outcomes between the two groups.

The two groups were not significantly different in terms of birth weight, the incidence of low birth weight and Apgar scores (at 1 minute and 10 minutes) and perinatal complications.

There were no significant differences in length of stay between the referred and self-referred patients.

There was a significant association between time of arrival and referral ($p < 0.01$). More referred patients arrived after hours in comparison to self-referred patients. There was a significant association between type of transport used and referral ($p < 0.05$). More referred patients arrived with ambulance in comparison to self-referred patients. There were significant differences in the distances from place of residences to PHC facilities between the referred and self-referred patients. The residences of referred patients were farther from the PHC facilities than the self-referred patients. There were significant differences in the distances from place of residence and this Hospital between the referred and self-referred patients ($p < 0.03$). The residences of referred patients were farther from the Hospital than the self-referred patients.

6.2 LIMITATIONS OF THE STUDY

The main limitations of this study were missing information on the Hospital Information System. In cases of missing records, the researcher went through the maternity registrars and patients' files to retrieve the missing information.

6.3 RECOMMENDATIONS

6.3.1 FOLLOW-UP

This project is the first systematic study to be done at the Ganyesa District Hospital. This study identified a high maternal and perinatal mortality rates as well as high prevalence of low birth weight. In view of that the researcher would like to suggest that:

- The doctors and midwives working at the Hospital should be retrained with latest guidelines, to reduce maternal and perinatal mortality and morbidity
- There is a need to engage district management and PHC clinics and CHCs to improve the referral system. For example, more patients should be referred during working hours, as there are fewer staff available after working hours.

6.3.2 FUTURE RESEARCH

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

- A qualitative study involving interview with patients and health professionals to develop an understanding of the referral system. This would provide insight as to why certain patients go to health facilities whereas others bypass them.
- A prospective cohort study to develop an understanding of the impact of self-referral on the resource utilization at this Hospital. This would assist to quantify the number of patients who could have been managed at the PHC facilities and delivered at the CHCs.

6.4 SUMMARY AND CONCLUSION

This is the first study in the North West Province which systematically studied hospital records for one year in order to compare the pregnancy outcomes (maternal and perinatal) between referred and self-referred patients who delivered at a district hospital (Ganyesa District Hospital) during a one year study period.

The study found that the geographical distance (from the place of residences to nearby health facilities) was the only factor that had a significant association with referral status.

This study identified a high maternal and perinatal mortality rates as well as high prevalence of low birth weight which would require farther investigation.

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APPENDICES

**APPENDIX A: ETHICS CLEARANCE CERTIFICATES
AND LETTERS OF APPROVAL**

APPENDIX B: DATA COLLECTION TOOLS