

**COMPARISON OF PREGNANCY OUTCOME BETWEEN BOOKED AND
UNBOOKED MOTHERS AT VAN VELDEN HOSPITAL
IN THE LIMPOPO PROVINCE**

ELLEN LOPANG MADIKE

A research report submitted to the Faculty of Health Sciences, University of
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DECLARATION

I, Ellen Lopang Madike, 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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DEDICATION

I would like to take gratitude, and acknowledge the support given to me during my years of study by my family. Firstly, I would love to thank my husband, Gregory for the support he gave me even though it was restricted and hindered by certain events, the injuries he endured in a car accident and I was away most of the times when he needed me the most. Hence, he is strong enough, he pulled through. Not forgetting the patience and love my children exercised throughout my studies, even though I was hardly there for them, to employ my role as a mother they did not love me any less. Daisy and Fabia having excelled as mother figures for their families and siblings in my absence, am proud of my girls. Augustine and Magdalene whom were both at school, at a critical point of their studies, Augustine beginning his tertiary studies and Magdalene completing her high school studies. Am conceited of them, for making it without my help.

ABSTRACT

BACKGROUND: The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development Goals (MDGs). South Africa has aligned itself with these MDGs. The 5th goal is focused on improving maternal health by reducing the maternal mortality rate by 75% by 2015. There are a number of interventions in place to try and to achieve this goal; the provision of antenatal care is one of these interventions. Antenatal care provides the expectant mother early ongoing monitoring and risk assessment of her pregnancy. It is commonly considered fact that antenatal care improves maternal and perinatal outcomes. In spite of the provision of free maternal health services in South Africa, there are still a significant number of mothers who do not attend antenatal clinics before delivery. No formal study has been done to understand the magnitude of this problem in the Limpopo Province. In view of this, it was decided to conduct this study at the Van Velden Hospital (a rural district hospital in the Mopani District in the Limpopo Province) which has been admitting a significant number of unbooked mothers even after the introduction of free maternal health services in South Africa sixteen years ago.

AIM: To compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at Van Velden Hospital, a district hospital in the Limpopo Province in South Africa.

METHODOLOGY: The setting of this study is the Maternity Unit at the Van Velden Hospital. A cross sectional study design was used. A retrospective record review was done and information for one year (2008/09) will be extracted from the records captured in the District Health Information System. No primary data was collected for this study.

RESULTS: This is the first study that looked at broad issues pertaining to the influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province and probably in South Africa. The study found a prevalence of 15.7% (range: 2.7% to 32.3%) among the study population during the 12 month study period. There were no significant differences in age, marital and employment status of the subjects. However, there were a significant number of teenage pregnancies (13.2%)

among the study population, which is of concern. Interestingly, more white women were found not to book in comparison to the black women. There were no significant differences in parity, gravidity and miscarriages between the two groups. Overall, unbooked mothers were more likely to have a preterm baby. This implies antenatal booking can probably prevent preterm deliveries. This study also found unbooked mothers were more likely to have C/S than booked mothers. However, there was no significant difference between booked and unbooked mothers in terms of delivery complications. There was no significant difference between booked and unbooked mothers in terms of birth weight. Although, the babies of unbooked mothers had a significantly lower Apgar score (1 minute) than booked mothers, the difference became insignificant at 10 minutes. There was no maternal mortality during this period. All mothers were discharged home. Overall, perinatal mortality among the study population was 44/ 1000 births. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

CONCLUSION: This research was undertaken to develop a model that could be used by both the provincial and national governments to evaluate the prevalence and impact of booking status of pregnant women in rural district hospitals in South Africa.

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GLOSSARY OF TERMS

Antenatal care: Antenatal care is care of a pregnant woman during the time in the maternity cycle that begins with conception and ends with the onset of labour.

Booked mother: A woman who has attended at least two antenatal clinics at least two weeks before giving birth at which booking bloods have been taken (WHO, 2009).

Booking bloods: Routine screening blood tests done on all mothers attending antenatal clinics. These include the haemoglobin level, serological investigation for syphilis (reactive plasma reagent). Rhesus typing and an HIV rapid test (with the mother's permission) (WHO, 2009)

Delivery attended by skilled health professional: Number of deliveries attended by skilled health care personnel (HST, 2009).

District Hospital: A level one hospital offering primary health care services.

Maternal mortality rate: Maternal deaths per 100,000 live births. (HST, 2009)

Rural hospital: A hospital situated within the rural communities, having no municipal infrastructure (waste removal and bulk water supply).

Un-booked mother: A mother who did not attend at or attend less than two antenatal clinics within stipulated period (WHO, 2009).

LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
CHC	Community Health Centre
CS	Caesarean section
DHS	District Health System
DHIS	District Health Information System
GP	General Practitioner
HOD	Head of the Department
MMR	Maternal Mortality Rate
VVH	Van Velden Hospital
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at a district hospital in the Limpopo Province in South Africa. 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

The WHO recommends use of the district model for maternal healthcare delivery. Within a health district of 500,000, the WHO recommends at least four facilities offering basic emergency care and one facility offering comprehensive emergency obstetric care (UNICEF, 1997). In South Africa, the community health centres (CHC) and fixed and mobile primary health care facilities offer basic maternity care, whereas district and regional hospitals are expected to offer comprehensive maternity care. 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, whereas complicated cases are referred to either a district hospital or a regional or tertiary hospital, if they require specialist intervention.

Free maternal health services were introduced in 1994 (Republic of South Africa, 1994). However, a study done in 1998 found a significant number of women did not access antenatal care before delivery (Fonn, Xaba, Tint, et al., 1998). The researcher perceived that the situation has remained the same even after 15 years.

1.2 JUSTIFICATION OF THIS STUDY

Van Velden Hospital is a rural district hospital in the Mopani District in the Limpopo Province. It is situated in Tzaneen town which is in Greater Tzaneen Local Municipality. It serves eight clinics on the north – eastern part of the District, which refers patients to this Hospital. The perception of the Hospital management was that the Maternity Unit of the Hospital has been admitting increasing numbers of unbooked mothers over the past few years. However, the Hospital management is not clear about the effect of this increasing number of unbooked mothers on the Hospital service delivery and their pregnancy outcomes. Therefore, the researcher would like to systematically analyse the routinely collected data from the District Health Information system to determine the prevalence of unbooked mother and their pregnancy outcomes. The study hopes to provide the Hospital and Limpopo provincial management with input in relation to the prevalence of unbooked mothers and their pregnancy outcomes in a rural setting.

1.3 RESEARCH QUESTION

What are the differences in the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at the Van Velden Hospital during the period 1st April 2008 to 31st March 2009?

1.4 STUDY OBJECTIVES

1.4.1 BROAD OBJECTIVE

To compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at Van Velden Hospital during the period 1st April 2008 to 31st March 2009.

1.4.2 SPECIFIC OBJECTIVES

1. To determine the prevalence of unbooked mothers during the study period (April 2008 to March 2009).
2. To determine the profile of mothers (booked and unbooked) who delivered at the Maternity Unit during the study period as regards to the following:
 - 2.1 Demographic profile (age, ethnicity)
 - 2.2 Booking status (booked/ unbooked)
 - 2.3 Obstetric profile (Ante-partum: parity, past obstetric history), Intra-partum (Induction, mode of delivery, complications at delivery), Post-partum (complications)
 - 2.4 Perinates: birth weight, and Apgar score
 - 2.5 Final outcome: Mother and Baby
3. To compare the profiles and final outcomes of booked and unbooked mothers for the same period

1.5 SUBSEQUENT CHAPTERS

So far, the background to the research has been discussed. Then, research question and objectives were defined in this first chapter. 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

LITERATURE REVIEW

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

2.1 MATERNAL HEALTH

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, it is associated with suffering, ill-health and even death for too many women. There is little information about maternal health and morbidity in many countries and, therefore, maternal mortality is often used as a proxy indicator for maternal health (Filippi, Ronsmans, Gohou, et al., 2005). Every minute, at least one woman dies from complications related to pregnancy or childbirth i.e. 529,000 women per year. In addition, for every woman who dies in childbirth, around 20 more suffer injury, infection or disease – approximately 10 million women each year (WHO, 2009). Five direct complications that account for more than 70% of maternal deaths are: haemorrhage, infection, unsafe abortion, eclampsia and obstructed labour. This did not change during the 12 year period from 1988 to 2000 (Khan, Wojdyla, Say, et al, 2006) and even during the last decade (WHO, 2009).

Unavailable, inaccessible, unaffordable, and/or poor quality care are fundamentally responsible for maternal deaths worldwide. These deaths are detrimental to social development and well-being, as some one million children are left motherless each year. These children are 10 times more likely to die within two years of their mothers' death (WHO, 2005).

2.2 MATERNAL HEALTH SERVICES IN DEVELOPED COUNTRIES

The importance of maternal health care is acknowledged nationally and internationally and listed among one of the Millennium development goals (WHO, 2004). For last few decades, maternal health care became one of the key points in the health care service deliveries in developed countries and because of that, these countries achieved significant results in terms of reduction of maternal mortality and morbidity. For example in Australia, the Western Australian Department of Health developed integrated and responsive maternal health care services that can be adapted according to the individual need of the patients in their own settings ((Western Australian Department of Health, 2007). In the United Kingdom, maternal care is available to all women (The House of Commons, 2003).

2.3 MATERNAL HEALTH SERVICES IN DEVELOPING COUNTRIES

The situation is different in developing countries. In these countries, maternal mortality and morbidity remain high. However, many countries have taken important steps to address this problem.

In Tanzania, Jahn, Kowalewski and Kimatta (1996) reported that despite pursuing the risk approach and good antenatal coverage, antenatal care in Tanzania has only limited effect on extending obstetric care to high-risk mothers. In Zambia, the Department of Health has taken necessary steps to provide a patient-centred family orientated maternal health care services based on “Making pregnancy safer initiative’ of WHO (Maimbolwa, 2004). In Mozambique, the Department of Health introduced a patient friendly community participation approach by involving the patients, their families and communities (Sundby, Rwanmushaija and Usta, 2002).

Although the effect of these newer initiatives on maternal mortality and morbidity is yet to be seen, there are some evidences emerging. For example, in Ghana, utilization of maternal health services was found to be directly associated with reduction in maternal and neonatal mortality (Ansong-Tomui,

Amar-Klenesa, Arhinful, et al., 2007). In Botswana, the number of syphilis cases were declining because of compulsory checking of Rapid Plasma Reagin (RPR) test during antenatal attendance (Creek, Thuku, Kolou, et al., 2005).

2.4 MATERNAL HEALTH SERVICES IN SOUTH AFRICA

In South Africa, maternal and child care always remained as key priority areas for the Government. The South African government also introduced free maternal care in 1994 (Republic of South Africa, 1994). The Maternal child and women's health is currently one of the strategic goals for the current strategic plan (Department of Health, 2009). As a part of that process, the Minister of Health established National Committee for Confidential Enquiries into Maternal Deaths. This Committee has produced four reports till date. These reports critically analyse the maternal mortality in South Africa and provide valuable recommendations. However, most of these recommendations remained same for the last decade and not much progress has been made for implementation of these recommendations at the facility level. Poor record-keeping, inadequate supervision, poor levels of clinical knowledge and under-utilisation of midwife obstetric units were some of the challenges identified for maternal health services in South Africa (Thomas, Jina, Tint, et al., 2007)

Maternity cases in South Africa are managed in different levels of health care (primary, secondary or tertiary) according to the risk category of patients. Patients are classified into no risk, low risk, medium risk and high risk. Based on the classifications, the cases are managed at appropriate level of care. This risk classification is expected to guide the management of cases at the health facilities. This arrangement is expected to improve maternal services and maternal and perinatal outcomes (Farrell and Pattinson, 2005). However, a similar study done in Zimbabwe did not find the usefulness of risk scores (Majoko, Nyström, Munjanja, et al. 2002).

Recently, the Perinatal Mother to Child Transmission (PMTCT) Programme became an integral part of maternal health services. Adequate management of HIV in pregnancy is key to the successful implementation of maternal health services due to a high prevalence of HIV in this country (Hoque, Hoque and Kader, 2008).

2.5 ANTENATAL CARE

Antenatal care is identified as one of the key programmes for improvement of maternal health not only in South Africa but also rest of the world.

Antenatal care is an intervention aimed at pregnant women to ensure the best possible outcome for both the mother and the baby. The World Health Organization (WHO) recommends antenatal care to be one of the interventions aimed at decreasing maternal and perinatal mortality and it recommends at least four visits for an adequate level of antenatal care (WHO, 2009). Women should book as soon as pregnancy is detected which could be as early as six weeks of gestation in order to be screened for any pregnancy related problems, to review the risk of the pregnancy and to make provision for medications that may improve the pregnancy outcome (Cronje and Grobler, 2003; WHO, 2009). A woman is generally considered to be booked if she has had at least two clinic visits at least two weeks before giving birth and had booking bloods taken at the first visit. Despite all the advantages of regular antenatal care, late bookings and missed visits still occur in South Africa. There are still some pregnant women who present to the health facility to deliver without ever attending any antenatal care. Some of the reasons for late bookings include the following: young age, primigravidae, multigravidae, being a single parent, low socio-economic status, unemployment, and time constraints and for some women, the distance away from the health care facility contributes to being un-booked (Blondel, Dutil, Delour, et al, 1993; Mutihir and Nyiputen, 2007).

Booked women are found to get early, ongoing monitoring and a continuous risk assessment (Fiscella, 1995). This includes health education, information

about self-care in pregnancy, danger signs and symptoms of pregnancy. The antenatal care could address a delivery plan with an estimated date, place and mode of delivery for the current pregnancy and allow for planning of future pregnancies and contraception use. If indicated, additional tests, nutritional supplements and treatment of medical problems could be commenced. Antenatal care also has the additional advantage of ensuring that a woman is attended to by a skilled healthcare professional during pregnancy and labour which is an important point of entry in the prevention of mother to child transmission of HIV (Abou-Zahr and Wardlaw, 2003). On the other hand, unbooked pregnant women were found to be twice at risk of operative delivery, four times more likely to suffer delivery complications and twice likely to have low birth weight babies when compared to booked patients (Okunlola, Owonikoko, Fawole, et al., 2008).

With regards to universal access to reproductive health, the provision of antenatal care is used as an indicator of access. The 2003 South African Demographic Health Survey (SADHS) reported antenatal attendance to be in the region of 92% for the pregnant population, which was slightly lower (94%) than the 1998 survey. About 5.3% of pregnant women never attended antenatal care and the remaining 2.7% had no knowledge of any antenatal care service provision. The majority (60%) of first antenatal visits occurred within the first 6 months of pregnancy. Approximately one quarter of women attended for the first time at between 6 and 7 months and almost 3% attended for the first time in their 8th month of pregnancy (Department of Health, 2007). The 2006 District Health Information System (DHIS) data reported antenatal coverage of 100% but some provinces (such as Gauteng, Kwa-Zulu Natal, Mpumalanga and Northern Cape) reported antenatal coverage of more than 100%, raising concerns about the quality of data. The same report described the average number of antenatal visits was 3.4 (Health Systems Trust, 2009).

Briggs (1988) studied a cohort of 10,665 deliveries in a hospital in Nigeria and found booking status was significantly associated with ante-partum and postpartum haemorrhage, severe anaemia, and undiagnosed medical and surgical complications. The author stressed the importance of antenatal care

as one of the key factors to a large-scale reduction in maternal mortality. Subsequently, another Nigerian study in a different hospital found 29% unbooked mother among a cohort of 1,154 deliveries. The study also found a significant association between booking status and occurrence of maternal complications (such as anaemia and ante-partum haemorrhage) and perinatal outcomes (such as preterm babies) (Owalabi, Fatusi, Adeyami, et al., 2008). However, a South African study found no difference in the perinatal mortality between booked and unbooked mothers, although there were higher rates of low birth weight and prematurity among the unbooked mothers (Ndiweni, and Buchmann, 1998). This study was in an urban setting (Soweto, Johannesburg) which may not be extrapolated to rural settings. Therefore, the researcher believes that this study would be able to address that gap.

2.6 ANTENATAL CARE BOOKING AND PROFILE OF PATIENTS

It is important to identify profile of unbooked patients and develop an understanding of the factors that might influence their inability to book during pregnancy.

Almost thirty years ago, Larsen and van Middelkoop (1982) conducted a study at the King Edward VIII Hospital, Durban and found that the unbooked mother was found to come more frequently from a background of unstable relationships, financial and emotional support and geographical inaccessibility. Unwanted babies and inadequate parenting arrangements were more frequent in this group. Previous operative deliveries were found to have no influence on booking status. A recent study done in Azerbaijan found women's education, socio-economic status, gravidity and desirability of the current pregnancy have a significant effect on antenatal care utilisation (Habibov, 2010). This was similar to findings of a study done in Brussels, where researchers found women's education, higher socio-economic status, low gravidity had a significant effect on higher antenatal care utilisation (Beeckman, Louckx, Putman, 2010). They also found ethnicity, and previous medical history played some role.

In addition to the patient related factors, assessing health care facilities may also play a role in antenatal care utilization. This is influenced by various factors such as transport from home, poor quality of services, attitude of health care providers (Gaunt, 2010).

Therefore, it is important to study both patient and health system related factors in a local setting to develop an understanding of antenatal care utilization in that area.

CHAPTER 3

METHODOLOGY

The methodology for this study was selected on the basis of its aims. The study design is presented first followed by setting and scope of the study, and data collection methods, research tools and data analysis. Finally, issues surrounding ethics are discussed.

3.1 STUDY DESIGN

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

3.2 STUDY SETTING

The study setting was the Maternity Unit of the Van Velden Hospital (VVH). The VVH is a district Hospital situated in the Greater Tzaneen Municipal area.

Mopani District Municipality

The Mopani District Municipality (DC33) is situated within the lowveld portion of the Limpopo Province. The district borders the bigger portion of the Kruger National Park, and is well known for its game and plantations. It consists of four Local Municipalities. The geographical area of the municipality is 11,097 km². The population in the District is 1 019 199: 46% (466 152) are male and 54% (553 047) female. The illiteracy level is high (241 873) and a significant number of people (705 336) are not married. The languages mainly spoken are Sepedi, Tsonga, Afrikaans and English. Most people are still travelling on foot, which hampers access to health services. Means of communication is mostly cell phones (53 528, 4%) and very few have land lines (0.4%). This makes the communication with patients difficult (Municipal Demarcation Board, 2009).



Figure 3.1 Mopani Health District

Van Velden Hospital

The Van Velden Hospital (VVH) is a District Hospital situated in the Greater Tzaneen Municipal area. It is 109 kilometres east of Polokwane. As part of the national policy, this Hospital forms part of the Mopani District Health System (DHS). This Hospital supports primary health care in the district and patients are referred from community health centres and clinics to district hospitals for level one (generalist) services to in-patients and outpatients. In some circumstances, primary health care services are rendered where there is no alternative source of this care within a reasonable distance (Department of Health, 2002). The Hospital is expected to manage low risk patients.

The Hospital has 86 in-patient beds. The maternity wards in the Hospital are listed in Table 3.1.

Table 3.1 In-patient wards in the Van Velden Hospital

Wards	Number of beds
Antenatal	5
Caesarean section	5
Post-Natal	10
Total	20

The Hospital has six medical doctors (general practitioners) and 66 nurses.

Among the nursing staff:

- 48 are professional nurses,
- 10 are staff nurses and
- 8 are auxiliary nurse.

3.3 STUDY SCOPE

The study was based on a retrospective review of the existing hospital electronic database. No primary data was collected for this study.

3.4 STUDY PERIOD

The period of this study was one year (1 April 2008 to 31 March 2009)

3.5 STUDY POPULATION AND SAMPLE

The study population included all records of booked mothers who has attended two antenatal clinics at least two weeks before giving birth, and those who attended medical practitioners in private at which booking bloods have been taken and unbooked mothers who did not attend at least two antenatal clinics two weeks before giving birth and has no booking bloods taken but delivered at the VVH during the study period (01 April 2008 to 31 March 2009). Those delivered by private medical practitioners were considered as booked. Therefore no sampling was done.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data for this study are routinely collected for the DHIS. Data from the DHIS was extracted using the MS Excel based data collection tool. These tools were designed specifically for this study.

3.6.2 STUDY INSTRUMENT

Data relevant to this study is routinely collected electronically for the District Health Information system (DHIS). Information was extracted from the DHIS using the data extraction sheet designed for this study (Appendix B).

3.6.3 VARIABLES

Variables that were used with their indicators for each objective are listed as Table 3.2 below:

- Prevalence of unbooked mothers
- Profile (Demographic and Clinical) of patients
- Booking status of patients
- Maternal and neonatal outcomes

3.6.4 DATA ANALYSIS

Data was captured with MS Excel software and was analysed with NCSS software (NCSS, 2007). Following statistics were used for this study:

- Descriptive statistics: Central tendency (mean or median) and spread [standard deviation (SD) or interquartile range (IQR)] were used to analyse the numerical data. Proportions and ratios were used to analyse categorical data.
- Analytical statistics such as t-test were used to compare between two groups (such as booked and unbooked mothers). Multivariate analysis

was done to determine the effects of multiple variables on maternal and neonatal outcomes.

3.7 PILOT STUDY

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

3.8 ETHICAL CONSIDERATIONS

Permission for conducting research and accessing documents was sought from the head of the department of the Limpopo Provincial Department of Health. The study was also approved by the University of the Witwatersrand Human Research Ethics Committee (Medical) before the commencement of the study (Appendix A). Confidentiality and anonymity was maintained during collection, capturing, and reporting of the information. Patients' name and hospital numbers were not recorded in the data collection form and database.

CHAPTER 4

RESULTS

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

4.1 NUMBER OF PATIENTS DELIVERED AT THE HOSPITAL

The total number of deliveries during the study period is described in the Table 4.1. Total number of deliveries during this period was 593. The mean number of deliveries was 49 (± 18).

Table 4.1 Number of deliveries at the Hospital during one year

	No of deliveries n (%)	Booked (n %)	Unbooked n (%)
April 2008	71	54 (76.1%)	17 (23.9%)
May 2008	74	62 (83.8%)	12 (16.2%)
June 2008	72	59 (81.9%)	13 (18.1%)
July 2008	31	21 (67.7%)	10 (32.3%)
August 2008	26	20 (76.9%)	6 (23.1%)
September 2008	29	26 (89.7%)	3 (10.3%)
October 2008	66	57 (86.4%)	9 (13.6%)
November 2008	36	32 (88.9%)	4 (11.1%)
December 2008	50	44 (88%)	6 (12%)
January 2009	53	47 (88.7%)	6 (11.3%)
February 2009	37	36 (97.3%)	1 (2.7%)
March 2009	48	42 (87.5%)	6 (12.5%)
Total	593 (100%)	500 (84.3%)	93 (15.7%)

Among these patients, 500 (84.3%) were booked and 93 (15.7%) were unbooked (Figure 4.1). The proportion of mothers who were booked varied from 67.7% to 97.3%.

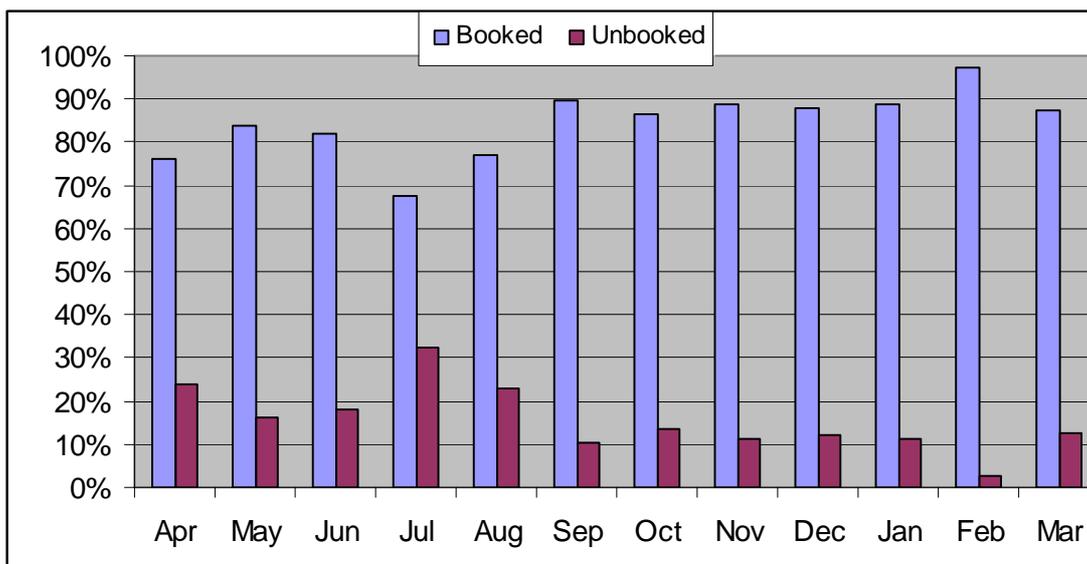


Figure 4.1 Booked and Unbooked mothers (n =593)

4.2 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

4.2.1 AGE

The age distribution of the subjects was described in Table 4.2. The age was not normally distributed. The median age was 25 (IQR 21-31) There was no significant differences in age between the booked and unbooked mothers (Mann Whitney’s U test, p=0.15).

Table 4.2 Age of the subjects

Age in years	Total	Booked	Unbooked
Median	25 (21 – 31)	25 (21 – 31)	26 (22-34)
Interquartile range			
Range	(14 – 47)	(14 – 47)	(14-46)

Seventy eight (13.2%) of them were teenagers (\leq : 19 years of age). 66 (13.2%) of them were booked and 12 (12.9%) were unbooked.

4.2.2 ETHNICITY

The ethnicity of the patients is described in Table 4.3. There was a significant association between booking status and ethnicity (Mann Whitney's U test $P < 0.0001$). More whites patients were found to be unbooked than black patients.

Table 4.3 Ethnicity of the subjects

Ethnicity	Total	Booked	Unbooked
African	582 (98%)	495 (85.1%)	87 (19.9%)
White	11 (2%)	5 (4.5%)	6 (59 %)
Total	593 (100%)	500 (100%)	93 (100%)

4.2.3 MARITAL STATUS

The marital status of the subjects was described in Table 4.4. There was no significant difference between the booked and unbooked mothers in terms of their marital status (Mann Whitney's U test, $p = 0.98$).

Table 4.4 Marital status

Marital status	Total No of deliveries n (%)	Booked (n %)	Unbooked n (%)
Single	18 (31%)	156 (31.2%)	28 (31%)
Married	39 (66.8%)	33 (66.8%)	63 (66.9%)
Widowed	5 (0.8%)	4(0.8%)	1 (1.1%)
Divorced	7 (1.2%)	6 (1.2%)	1(1.1%)
TOTAL	593 (100%)	500 (100%)	93 (100%)

4.2.4 EMPLOYMENT STATUS

The employment of the subjects was described in Table 4.5. There was no significant association between booking and employment status (Chi-square test, $p=0.89$).

Table 4.5 Employment status

Employment status	Total	Booked	Unbooked
Employed	51 (86.7%)	67 (13.4%)	12 (12.9%)
Unemployed	79 (13.3%)	433 (83.6%)	81 (87.1)
TOTAL	593 (100%)	500 (100%)	93 (100%)

4.3 CLINICAL PROFILE OF PATIENTS

4.3.1 PARITY AND GRAVIDITY OF THE SUBJECTS

The parity of the subjects was described in Table 4.6. There was no significant difference between the booked and unbooked mothers in terms of parity (Mann Whitney's U test, $p = 0.14$).

Table 4.5 Parity and gravidity of the subjects

Parity	Total	Booked	Unbooked
Median (IQR)	1 (0 – 2)	1(0 – 2)	1 (0 – 2)
Range	(0 – 8)	(0 – 8)	(0 – 6)
Gravidity			
Median (IQR)	2 (1 – 3)	2 (1 – 3)	2 (1-3)
Range	(0 – 10)	(0 – 10)	(0 – 7)

The gravidity of the subjects was described in Table 4.5. There was no significant difference between the booked and unbooked mothers in terms of gravidity (Mann Whitney's U test, $p =0.13$).

4.3.2 PREVIOUS HISTORIES OF MISCARRIAGES

The number of miscarriages among the subjects was described in Table 4.6. Twenty-eight patients (4.7%) had miscarriages. Eight of them had more than one miscarriage. There was no significant association between previous history of miscarriages and booking status (Chi-square test, $p = 0.12$).

Table 4.6 Previous histories of miscarriages

Miscarriages	Total	Booked	Unbooked
Yes	28 (4.7%)	21 (4.2%)	7 (7.5%)
No	565 (95.3%)	479 (95.8%)	86 (92.5%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.3 GESTATIONAL AGE AT BOOKING

Among the mothers who were booked, mean gestational age at first booking was 23 weeks (± 5 weeks).

4.3.4 GESTATIONAL AGE AT DELIVERY

The gestational age at delivery of the subjects was described in Table 4.7. There was significant association between booking status and preterm babies (Chi-square test, $p < 0.05$), as there were more preterm deliveries among the unbooked mothers.

Table 4.7 Gestational age at delivery

Gestational age in weeks	Total	Booked	Unbooked
Term	589 (98.5%)	495 (99.0)	89 (95.7%)
Preterm	9 (1.5%)	5 (1%)	4 (4.3%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.5 INDUCTION OF LABOUR

Only one patient (booked) had an induction of labour.

4.3.6 MODE OF DELIVERY

The mode of delivery of the subjects was described in Table 4.8. There was a significant association between mode of delivery and booking status (Chi-square test, $p < 0.02$). The C/S rate was high among the unbooked mothers.

Table 4.8 Mode of delivery

Mode of delivery	Total	Booked	Unbooked
Breech	8 (1.3%)	5 (1%)	3 (3.2%)
C/S	140 (23.6%)	109 (21.8%)	31 (33.3%)
NVD	428 (72.2%)	372 (79.9%)	56 (60.2%)
Vacuum	17 (2.9%)	14 (2.8%)	3 (3.4%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.7 COMPLICATIONS AT DELIVERY

The complicated deliveries of the subjects were described in Table 4.9. There were no significant differences between booked and unbooked mothers in terms of delivery complications (Chi-square test, $p < 0.50$).

Table 4.9 Complications at delivery

	Total	Booked	Unbooked
No complications	456 (77%)	399 (78%)	69 (74%)
Complications	135 (33%)	111 (22%)	24 (26%)
Total	592 (100%)	500 (100%)	93 (100%)

The details of these complications are listed in Table 4.10.

Table 4.10 List of complications at delivery

Type	Total	Booked	Unbooked
1 st Degree tear	58	55	3
2 nd Degree tear	4	3	1
3 rd Degree tear	1	1	0
Vaginal tear	1	0	1
Labial tear	2	1	1
Cervico-vaginal lacerations	29	24	5
VVF	1	0	1
Cervical dystocia	1	1	0
Prolonged 2 nd Stage	1	1	0
Poor Progress	5	4	1
Failed induction	1	0	1
Intra-partum haemorrhage	1	1	0
Severe pregnancy induced hypertension	2	1	1
Eclampsia	1	1	0
Cord prolapse	4	0	4
Failed vacuum	1	0	1
Foetal Distress	20	18	2
Footling Breech	1	0	1
Hand prolapse	1	0	1
Total	135	111	24

There were no post-partum complications among the study population.

4.4 PERINATAL PROFILE

4.4.1 BIRTH WEIGHT

The birth weight on the babies was described in Table 4.11. There was no significant difference between booked and unbooked mothers in terms of birth weight (Mann Whitney's U test $p=0.88$).

Table 4.11 Birth weight

Birth weight in kg	Total	Booked	Unbooked
Median (IQR)	3.06 (2.76 – 3.39)	3.06 (2.76 – 3.30)	3.02 (2.76 – 3.4)
Range	(1.82 – 4.76)	(1.9 – 4.76)	(1.82 – 4.26)

4.4.2 APGAR SCORES

The Apgar scores (1 and 10 minutes) of the neonates were described in Table 4.12. There was a significant difference between booked and unbooked mothers in terms of Apgar score at 1 minute (Mann Whitney's U test $p=0.03$) but not so significant for Apgar score at 10 min (Mann Whitney's U test $p=0.06$). This implies babies of booked mother had significantly high Apgar score (1 min). However, the difference became insignificant at 10 min.

Table 4.12 Apgar score

Apgar score	Total	Booked	Unbooked
Apgar score- 1 min			
Median (IQR)	9 (9-9)	9 (9-9)	9 (9-9)
Range	(3-10)	(3-10)	(3-10)
Apgar score- 10 min			
Median (IQR)	10 (10-10)	10 (10-10)	10 (10-10)
Range	(8-10)	(9-10)	(8-10)

4.5 FINAL OUTCOME

4.5.1 MATERNAL OUTCOME

There was no maternal mortality during this study period. All mothers were discharged home.

4.5.2 PERINATAL OUTCOME

The perinatal outcome for the subjects was described in Table 4.13. There was no significant difference between the booked and unbooked mothers (Chi-square test, $p=0.29$).

Table 4.13 Perinatal outcome

Outcome	Total	Booked	Unbooked
Alive	567 (95.6%)	480 (96%)	87 (93.5%)
FSB	8 (1.3%)	7 (1.4%)	1 (1.1%)
MSB	7 (1.3%)	5 (1%)	2 (2.2%)
Died	11 (1.8%)	8 (1.6%)	3 (3.7%)
Total	593 (100%)	500 (100%)	93 (100%)

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 booked and unbooked mothers who delivered at a district hospital (Van Velden Hospital) during one year study period (1st April 2008 to 31st March 2009). No studies have been conducted at the level of a district hospital in a rural setting in the Limpopo Province to look at the influence of booking status on pregnancy outcomes.

5.2 STUDY POPULATION

The study population included 593 records of booked (500, 84.3%) and unbooked (n=93, 15.7%) mothers who delivered at the VVH during the study period (01 April 2008 to 31 March 2009). Records of all the patients who delivered at the Hospital during the study period. The study documented a significant number of unbooked mothers, which was similar to findings of previous studies conducted in South Africa (Larsen and van Middelkoop, 1982; Pattinson and Rossouw, 1987).

5.3 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

There are a number of socio-demographic factors that are found to be associated with booking status. These factors include: young age, being a single parent, low socio-economic status, unemployment, and time constraints and for some women, the distance away from the health care facility contributes to being un-booked (Larsen and van Middelkoop, 1982; Blondel, et al, 1993; Mutihir and Nyiputen, 2007; Beeckman, Louckx, Putman, 2010; Gaunt, 2010). However, this study found no significant differences in age,

marital and employment status of the patients. There was a significant number of teenage pregnancies (13.2%) among the study population, which is of concern. However, contrary to popular belief, there was no significant association between booking status and teenage pregnancy.

Beeckman, et al (2010) found an association between booking status in Brussels. Interestingly, this study found significantly more white women in the unbooked category ($p < 0.0001$). However, there was no significant association between employment status and ethnicity (Chi-square test, $p = 0.53$). Therefore, it can be postulated that they probably attended private doctors for antenatal care but came to deliver at the Hospital.

5.4 CLINICAL PROFILE OF PATIENTS

There are a number of clinical factors that are found to be associated with booking status reported in the previous studies. These factors include: both primigravidae, multigravidae, (Blondel, et al, 1993; Mutahir and Nyiputen, 2007), and previous medical history (Beeckman, et al., 2010). In other studies, previous operative deliveries were found to have no influence on booking status (Larsen and van Middelkoop, 1982). The study found no significant differences in parity, gravidity and miscarriages between the two groups. However, unbooked mothers were more likely to have a preterm baby ($p < 0.05$). This implies that antenatal booking may prevent preterm deliveries from occurring.

This study also found unbooked mothers were more likely to have C/S than booked mothers ($p < 0.02$). However, there was no significant difference between booked and unbooked mothers in terms of complications ($p < 0.50$). There were no referrals to level 2 or 3 hospitals, during the period of study.

5.5 PERINATAL PROFILE

There was no significant difference between booked and unbooked mothers in terms of birth weight (Mann Whitney's U test $p=0.88$). Although, the babies of unbooked mothers had a significantly lower Apgar score at 1 minute ($p=0.03$), the difference was not so significant for Apgar scores at 10 minutes ($p=0.06$). This coincides with the findings of this study, which demonstrated that there were more preterm deliveries among the unbooked mothers.

5.6 FINAL OUTCOME

Among the study population, there was no maternal mortality during this study period. All mothers were discharged home. There was no significant difference in perinatal mortality between the booked and unbooked mothers (Chi-square test, $p=0.29$).

CHAPTER 6

CONCLUSION 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 were 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 influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province.

6.1.1 PREVALENCE OF UNBOOKED MOTHERS WHO DELIVERED AT THE MATERNITY UNIT DURING THE STUDY PERIOD

The prevalence of unbooked mothers among the study population was 15.7% (n=93), which varied between 2.7% and 32.3% during the 12 month study period.

6.1.2 SOCIO-DEMOGRAPHIC AND CLINICAL PROFILE

The study found no significant differences in socio-demographic profile between booked and unbooked mothers except ethnicity. There were significantly more white women in the unbooked category. This study reported 13.2% teenage pregnancies among the study population, which is of concern. However, contrary popular belief, there was no significant association between booking status and teenage pregnancy.

The study found no significant differences in clinical profile between booked

and unbooked mothers except preterm labour and mode of delivery. Unbooked mothers were more likely to have a preterm baby and C/S deliveries. This implies antenatal booking can probably prevent preterm deliveries.

Although, the babies of unbooked mothers had a significantly lower Apgar score (1 min), the difference became insignificant at 10 min.

6.1.3 DETERMINATION OF THEIR OUTCOMES

There was no maternal mortality during this period. All mothers were discharged home. Perinatal mortality among the study population was 44/1000 birth. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

6.2 POSSIBLE LIMITATIONS OF THE STUDY

The limitations of the study were as follows:

1. There were missing information from 10 records in the electronic data base. This information was retrieved from the manual records.
2. This was cross-sectional study. A long term prospective study is necessary to understand the long term impact on the babies.
3. No primary data collection was done for this study.

6.3 RECOMMENDATIONS

The recommendations made below were based on the findings from this study as well as from the Maternity Unit staff. The analysis of the data also revealed some areas that need to be evaluated and recommendations were made based on the results of this study. Recommendations for further or more in depth research were also highlighted.

6.3.1 FOLLOW UP

Maternal health is currently a priority for the Limpopo Department of Health and Social Development. This study would hopefully assist the Province to develop an understanding of prevalence and impact of unbooked mothers on the maternal health services. Outcomes of the research will be presented to the district and provincial management of the Department of Health in Limpopo Province with the view of creating a model that can be used and rolled out to other hospitals with similar challenges in a rural setting.

6.3.2 FUTURE RESEARCH

The researcher would like to propose a long-term prospective study that would involve interviewing unbooked mothers to develop an understanding of the challenges faced by these women in that area.

6.4 SUMMARY AND CONCLUSIONS

This is the first study that looked at broad issues pertaining to the influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province and probably in South Africa. The study found a prevalence of 15.7% (range: 2.7% and 32.3%) unbooked mothers among the study population during the 12 month study period. There were no significant differences in socio-demographic profiles except ethnicity. There were no significant differences in clinical profile except preterm delivery and mode of delivery. This implies antenatal booking can probably prevent preterm deliveries. There was no maternal mortality during this period. All mothers were discharged home. Perinatal mortality among the study population was 44/ 1000 birth. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

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APPENDICES

**APPENDIX A: ETHICS CLEARANCE CERTIFICATE
AND LETTERS OF PERMISSION**

APPENDIX B: DATA COLLECTION SHEET

**COMPARISON OF PREGNANCY OUTCOME BETWEEN BOOKED AND
UNBOOKED MOTHERS AT VAN VELDEN HOSPITAL
IN THE LIMPOPO PROVINCE**

ELLEN LOPANG MADIKE

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, 2010

DECLARATION

I, Ellen Lopang Madike, 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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November 2010

DEDICATION

I would like to take gratitude, and acknowledge the support given to me during my years of study by my family. Firstly, I would love to thank my husband, Gregory for the support he gave me even though it was restricted and hindered by certain events, the injuries he endured in a car accident and I was away most of the times when he needed me the most. Hence, he is strong enough, he pulled through. Not forgetting the patience and love my children exercised throughout my studies, even though I was hardly there for them, to employ my role as a mother they did not love me any less. Daisy and Fabia having excelled as mother figures for their families and siblings in my absence, am proud of my girls. Augustine and Magdalene whom were both at school, at a critical point of their studies, Augustine beginning his tertiary studies and Magdalene completing her high school studies. Am conceited of them, for making it without my help.

ABSTRACT

BACKGROUND: The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development Goals (MDGs). South Africa has aligned itself with these MDGs. The 5th goal is focused on improving maternal health by reducing the maternal mortality rate by 75% by 2015. There are a number of interventions in place to try and to achieve this goal; the provision of antenatal care is one of these interventions. Antenatal care provides the expectant mother early ongoing monitoring and risk assessment of her pregnancy. It is commonly considered fact that antenatal care improves maternal and perinatal outcomes. In spite of the provision of free maternal health services in South Africa, there are still a significant number of mothers who do not attend antenatal clinics before delivery. No formal study has been done to understand the magnitude of this problem in the Limpopo Province. In view of this, it was decided to conduct this study at the Van Velden Hospital (a rural district hospital in the Mopani District in the Limpopo Province) which has been admitting a significant number of unbooked mothers even after the introduction of free maternal health services in South Africa sixteen years ago.

AIM: To compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at Van Velden Hospital, a district hospital in the Limpopo Province in South Africa.

METHODOLOGY: The setting of this study is the Maternity Unit at the Van Velden Hospital. A cross sectional study design was used. A retrospective record review was done and information for one year (2008/09) will be extracted from the records captured in the District Health Information System. No primary data was collected for this study.

RESULTS: This is the first study that looked at broad issues pertaining to the influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province and probably in South Africa. The study found a prevalence of 15.7% (range: 2.7% to 32.3%) among the study population during the 12 month study period. There were no significant differences in age, marital and employment status of the subjects. However, there were a significant number of teenage pregnancies (13.2%)

among the study population, which is of concern. Interestingly, more white women were found not to book in comparison to the black women. There were no significant differences in parity, gravidity and miscarriages between the two groups. Overall, unbooked mothers were more likely to have a preterm baby. This implies antenatal booking can probably prevent preterm deliveries. This study also found unbooked mothers were more likely to have C/S than booked mothers. However, there was no significant difference between booked and unbooked mothers in terms of delivery complications. There was no significant difference between booked and unbooked mothers in terms of birth weight. Although, the babies of unbooked mothers had a significantly lower Apgar score (1 minute) than booked mothers, the difference became insignificant at 10 minutes. There was no maternal mortality during this period. All mothers were discharged home. Overall, perinatal mortality among the study population was 44/ 1000 births. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

CONCLUSION: This research was undertaken to develop a model that could be used by both the provincial and national governments to evaluate the prevalence and impact of booking status of pregnant women in rural district hospitals in South Africa.

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GLOSSARY OF TERMS

Antenatal care: Antenatal care is care of a pregnant woman during the time in the maternity cycle that begins with conception and ends with the onset of labour.

Booked mother: A woman who has attended at least two antenatal clinics at least two weeks before giving birth at which booking bloods have been taken (WHO, 2009).

Booking bloods: Routine screening blood tests done on all mothers attending antenatal clinics. These include the haemoglobin level, serological investigation for syphilis (reactive plasma reagent). Rhesus typing and an HIV rapid test (with the mother's permission) (WHO, 2009)

Delivery attended by skilled health professional: Number of deliveries attended by skilled health care personnel (HST, 2009).

District Hospital: A level one hospital offering primary health care services.

Maternal mortality rate: Maternal deaths per 100,000 live births. (HST, 2009)

Rural hospital: A hospital situated within the rural communities, having no municipal infrastructure (waste removal and bulk water supply).

Un-booked mother: A mother who did not attend at or attend less than two antenatal clinics within stipulated period (WHO, 2009).

LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
CHC	Community Health Centre
CS	Caesarean section
DHS	District Health System
DHIS	District Health Information System
GP	General Practitioner
HOD	Head of the Department
MMR	Maternal Mortality Rate
VVH	Van Velden Hospital
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at a district hospital in the Limpopo Province in South Africa. 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

The WHO recommends use of the district model for maternal healthcare delivery. Within a health district of 500,000, the WHO recommends at least four facilities offering basic emergency care and one facility offering comprehensive emergency obstetric care (UNICEF, 1997). In South Africa, the community health centres (CHC) and fixed and mobile primary health care facilities offer basic maternity care, whereas district and regional hospitals are expected to offer comprehensive maternity care. 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, whereas complicated cases are referred to either a district hospital or a regional or tertiary hospital, if they require specialist intervention.

Free maternal health services were introduced in 1994 (Republic of South Africa, 1994). However, a study done in 1998 found a significant number of women did not access antenatal care before delivery (Fonn, Xaba, Tint, et al., 1998). The researcher perceived that the situation has remained the same even after 15 years.

1.2 JUSTIFICATION OF THIS STUDY

Van Velden Hospital is a rural district hospital in the Mopani District in the Limpopo Province. It is situated in Tzaneen town which is in Greater Tzaneen Local Municipality. It serves eight clinics on the north – eastern part of the District, which refers patients to this Hospital. The perception of the Hospital management was that the Maternity Unit of the Hospital has been admitting increasing numbers of unbooked mothers over the past few years. However, the Hospital management is not clear about the effect of this increasing number of unbooked mothers on the Hospital service delivery and their pregnancy outcomes. Therefore, the researcher would like to systematically analyse the routinely collected data from the District Health Information system to determine the prevalence of unbooked mother and their pregnancy outcomes. The study hopes to provide the Hospital and Limpopo provincial management with input in relation to the prevalence of unbooked mothers and their pregnancy outcomes in a rural setting.

1.3 RESEARCH QUESTION

What are the differences in the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at the Van Velden Hospital during the period 1st April 2008 to 31st March 2009?

1.4 STUDY OBJECTIVES

1.4.1 BROAD OBJECTIVE

To compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at Van Velden Hospital during the period 1st April 2008 to 31st March 2009.

1.4.2 SPECIFIC OBJECTIVES

1. To determine the prevalence of unbooked mothers during the study period (April 2008 to March 2009).
2. To determine the profile of mothers (booked and unbooked) who delivered at the Maternity Unit during the study period as regards to the following:
 - 2.1 Demographic profile (age, ethnicity)
 - 2.2 Booking status (booked/ unbooked)
 - 2.3 Obstetric profile (Ante-partum: parity, past obstetric history), Intra-partum (Induction, mode of delivery, complications at delivery), Post-partum (complications)
 - 2.4 Perinates: birth weight, and Apgar score
 - 2.5 Final outcome: Mother and Baby
3. To compare the profiles and final outcomes of booked and unbooked mothers for the same period

1.5 SUBSEQUENT CHAPTERS

So far, the background to the research has been discussed. Then, research question and objectives were defined in this first chapter. 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

LITERATURE REVIEW

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

2.1 MATERNAL HEALTH

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, it is associated with suffering, ill-health and even death for too many women. There is little information about maternal health and morbidity in many countries and, therefore, maternal mortality is often used as a proxy indicator for maternal health (Filippi, Ronsmans, Gohou, et al., 2005). Every minute, at least one woman dies from complications related to pregnancy or childbirth i.e. 529,000 women per year. In addition, for every woman who dies in childbirth, around 20 more suffer injury, infection or disease – approximately 10 million women each year (WHO, 2009). Five direct complications that account for more than 70% of maternal deaths are: haemorrhage, infection, unsafe abortion, eclampsia and obstructed labour. This did not change during the 12 year period from 1988 to 2000 (Khan, Wojdyla, Say, et al, 2006) and even during the last decade (WHO, 2009).

Unavailable, inaccessible, unaffordable, and/or poor quality care are fundamentally responsible for maternal deaths worldwide. These deaths are detrimental to social development and well-being, as some one million children are left motherless each year. These children are 10 times more likely to die within two years of their mothers' death (WHO, 2005).

2.2 MATERNAL HEALTH SERVICES IN DEVELOPED COUNTRIES

The importance of maternal health care is acknowledged nationally and internationally and listed among one of the Millennium development goals (WHO, 2004). For last few decades, maternal health care became one of the key points in the health care service deliveries in developed countries and because of that, these countries achieved significant results in terms of reduction of maternal mortality and morbidity. For example in Australia, the Western Australian Department of Health developed integrated and responsive maternal health care services that can be adapted according to the individual need of the patients in their own settings ((Western Australian Department of Health, 2007). In the United Kingdom, maternal care is available to all women (The House of Commons, 2003).

2.3 MATERNAL HEALTH SERVICES IN DEVELOPING COUNTRIES

The situation is different in developing countries. In these countries, maternal mortality and morbidity remain high. However, many countries have taken important steps to address this problem.

In Tanzania, Jahn, Kowalewski and Kimatta (1996) reported that despite pursuing the risk approach and good antenatal coverage, antenatal care in Tanzania has only limited effect on extending obstetric care to high-risk mothers. In Zambia, the Department of Health has taken necessary steps to provide a patient-centred family orientated maternal health care services based on “Making pregnancy safer initiative’ of WHO (Maimbolwa, 2004). In Mozambique, the Department of Health introduced a patient friendly community participation approach by involving the patients, their families and communities (Sundby, Rwanmushaija and Usta, 2002).

Although the effect of these newer initiatives on maternal mortality and morbidity is yet to be seen, there are some evidences emerging. For example, in Ghana, utilization of maternal health services was found to be directly associated with reduction in maternal and neonatal mortality (Ansong-Tomui,

Amar-Klenesa, Arhinful, et al., 2007). In Botswana, the number of syphilis cases were declining because of compulsory checking of Rapid Plasma Reagin (RPR) test during antenatal attendance (Creek, Thuku, Kolou, et al., 2005).

2.4 MATERNAL HEALTH SERVICES IN SOUTH AFRICA

In South Africa, maternal and child care always remained as key priority areas for the Government. The South African government also introduced free maternal care in 1994 (Republic of South Africa, 1994). The Maternal child and women's health is currently one of the strategic goals for the current strategic plan (Department of Health, 2009). As a part of that process, the Minister of Health established National Committee for Confidential Enquiries into Maternal Deaths. This Committee has produced four reports till date. These reports critically analyse the maternal mortality in South Africa and provide valuable recommendations. However, most of these recommendations remained same for the last decade and not much progress has been made for implementation of these recommendations at the facility level. Poor record-keeping, inadequate supervision, poor levels of clinical knowledge and under-utilisation of midwife obstetric units were some of the challenges identified for maternal health services in South Africa (Thomas, Jina, Tint, et al., 2007)

Maternity cases in South Africa are managed in different levels of health care (primary, secondary or tertiary) according to the risk category of patients. Patients are classified into no risk, low risk, medium risk and high risk. Based on the classifications, the cases are managed at appropriate level of care. This risk classification is expected to guide the management of cases at the health facilities. This arrangement is expected to improve maternal services and maternal and perinatal outcomes (Farrell and Pattinson, 2005). However, a similar study done in Zimbabwe did not find the usefulness of risk scores (Majoko, Nyström, Munjanja, et al. 2002).

Recently, the Perinatal Mother to Child Transmission (PMTCT) Programme became an integral part of maternal health services. Adequate management of HIV in pregnancy is key to the successful implementation of maternal health services due to a high prevalence of HIV in this country (Hoque, Hoque and Kader, 2008).

2.5 ANTENATAL CARE

Antenatal care is identified as one of the key programmes for improvement of maternal health not only in South Africa but also rest of the world.

Antenatal care is an intervention aimed at pregnant women to ensure the best possible outcome for both the mother and the baby. The World Health Organization (WHO) recommends antenatal care to be one of the interventions aimed at decreasing maternal and perinatal mortality and it recommends at least four visits for an adequate level of antenatal care (WHO, 2009). Women should book as soon as pregnancy is detected which could be as early as six weeks of gestation in order to be screened for any pregnancy related problems, to review the risk of the pregnancy and to make provision for medications that may improve the pregnancy outcome (Cronje and Grobler, 2003; WHO, 2009). A woman is generally considered to be booked if she has had at least two clinic visits at least two weeks before giving birth and had booking bloods taken at the first visit. Despite all the advantages of regular antenatal care, late bookings and missed visits still occur in South Africa. There are still some pregnant women who present to the health facility to deliver without ever attending any antenatal care. Some of the reasons for late bookings include the following: young age, primigravidae, multigravidae, being a single parent, low socio-economic status, unemployment, and time constraints and for some women, the distance away from the health care facility contributes to being un-booked (Blondel, Dutil, Delour, et al, 1993; Mutihir and Nyiputen, 2007).

Booked women are found to get early, ongoing monitoring and a continuous risk assessment (Fiscella, 1995). This includes health education, information

about self-care in pregnancy, danger signs and symptoms of pregnancy. The antenatal care could address a delivery plan with an estimated date, place and mode of delivery for the current pregnancy and allow for planning of future pregnancies and contraception use. If indicated, additional tests, nutritional supplements and treatment of medical problems could be commenced. Antenatal care also has the additional advantage of ensuring that a woman is attended to by a skilled healthcare professional during pregnancy and labour which is an important point of entry in the prevention of mother to child transmission of HIV (Abou-Zahr and Wardlaw, 2003). On the other hand, unbooked pregnant women were found to be twice at risk of operative delivery, four times more likely to suffer delivery complications and twice likely to have low birth weight babies when compared to booked patients (Okunlola, Owonikoko, Fawole, et al., 2008).

With regards to universal access to reproductive health, the provision of antenatal care is used as an indicator of access. The 2003 South African Demographic Health Survey (SADHS) reported antenatal attendance to be in the region of 92% for the pregnant population, which was slightly lower (94%) than the 1998 survey. About 5.3% of pregnant women never attended antenatal care and the remaining 2.7% had no knowledge of any antenatal care service provision. The majority (60%) of first antenatal visits occurred within the first 6 months of pregnancy. Approximately one quarter of women attended for the first time at between 6 and 7 months and almost 3% attended for the first time in their 8th month of pregnancy (Department of Health, 2007). The 2006 District Health Information System (DHIS) data reported antenatal coverage of 100% but some provinces (such as Gauteng, Kwa-Zulu Natal, Mpumalanga and Northern Cape) reported antenatal coverage of more than 100%, raising concerns about the quality of data. The same report described the average number of antenatal visits was 3.4 (Health Systems Trust, 2009).

Briggs (1988) studied a cohort of 10,665 deliveries in a hospital in Nigeria and found booking status was significantly associated with ante-partum and postpartum haemorrhage, severe anaemia, and undiagnosed medical and surgical complications. The author stressed the importance of antenatal care

as one of the key factors to a large-scale reduction in maternal mortality. Subsequently, another Nigerian study in a different hospital found 29% unbooked mother among a cohort of 1,154 deliveries. The study also found a significant association between booking status and occurrence of maternal complications (such as anaemia and ante-partum haemorrhage) and perinatal outcomes (such as preterm babies) (Owalabi, Fatusi, Adeyami, et al., 2008). However, a South African study found no difference in the perinatal mortality between booked and unbooked mothers, although there were higher rates of low birth weight and prematurity among the unbooked mothers (Ndiweni, and Buchmann, 1998). This study was in an urban setting (Soweto, Johannesburg) which may not be extrapolated to rural settings. Therefore, the researcher believes that this study would be able to address that gap.

2.6 ANTENATAL CARE BOOKING AND PROFILE OF PATIENTS

It is important to identify profile of unbooked patients and develop an understanding of the factors that might influence their inability to book during pregnancy.

Almost thirty years ago, Larsen and van Middelkoop (1982) conducted a study at the King Edward VIII Hospital, Durban and found that the unbooked mother was found to come more frequently from a background of unstable relationships, financial and emotional support and geographical inaccessibility. Unwanted babies and inadequate parenting arrangements were more frequent in this group. Previous operative deliveries were found to have no influence on booking status. A recent study done in Azerbaijan found women's education, socio-economic status, gravidity and desirability of the current pregnancy have a significant effect on antenatal care utilisation (Habibov, 2010). This was similar to findings of a study done in Brussels, where researchers found women's education, higher socio-economic status, low gravidity had a significant effect on higher antenatal care utilisation (Beeckman, Louckx, Putman, 2010). They also found ethnicity, and previous medical history played some role.

In addition to the patient related factors, assessing health care facilities may also play a role in antenatal care utilization. This is influenced by various factors such as transport from home, poor quality of services, attitude of health care providers (Gaunt, 2010).

Therefore, it is important to study both patient and health system related factors in a local setting to develop an understanding of antenatal care utilization in that area.

CHAPTER 3

METHODOLOGY

The methodology for this study was selected on the basis of its aims. The study design is presented first followed by setting and scope of the study, and data collection methods, research tools and data analysis. Finally, issues surrounding ethics are discussed.

3.1 STUDY DESIGN

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

3.2 STUDY SETTING

The study setting was the Maternity Unit of the Van Velden Hospital (VVH). The VVH is a district Hospital situated in the Greater Tzaneen Municipal area.

Mopani District Municipality

The Mopani District Municipality (DC33) is situated within the lowveld portion of the Limpopo Province. The district borders the bigger portion of the Kruger National Park, and is well known for its game and plantations. It consists of four Local Municipalities. The geographical area of the municipality is 11,097 km². The population in the District is 1 019 199: 46% (466 152) are male and 54% (553 047) female. The illiteracy level is high (241 873) and a significant number of people (705 336) are not married. The languages mainly spoken are Sepedi, Tsonga, Afrikaans and English. Most people are still travelling on foot, which hampers access to health services. Means of communication is mostly cell phones (53 528, 4%) and very few have land lines (0.4%). This makes the communication with patients difficult (Municipal Demarcation Board, 2009).



Figure 3.1 Mopani Health District

Van Velden Hospital

The Van Velden Hospital (VVH) is a District Hospital situated in the Greater Tzaneen Municipal area. It is 109 kilometres east of Polokwane. As part of the national policy, this Hospital forms part of the Mopani District Health System (DHS). This Hospital supports primary health care in the district and patients are referred from community health centres and clinics to district hospitals for level one (generalist) services to in-patients and outpatients. In some circumstances, primary health care services are rendered where there is no alternative source of this care within a reasonable distance (Department of Health, 2002). The Hospital is expected to manage low risk patients.

The Hospital has 86 in-patient beds. The maternity wards in the Hospital are listed in Table 3.1.

Table 3.1 In-patient wards in the Van Velden Hospital

Wards	Number of beds
Antenatal	5
Caesarean section	5
Post-Natal	10
Total	20

The Hospital has six medical doctors (general practitioners) and 66 nurses.

Among the nursing staff:

- 48 are professional nurses,
- 10 are staff nurses and
- 8 are auxiliary nurse.

3.3 STUDY SCOPE

The study was based on a retrospective review of the existing hospital electronic database. No primary data was collected for this study.

3.4 STUDY PERIOD

The period of this study was one year (1 April 2008 to 31 March 2009)

3.5 STUDY POPULATION AND SAMPLE

The study population included all records of booked mothers who has attended two antenatal clinics at least two weeks before giving birth, and those who attended medical practitioners in private at which booking bloods have been taken and unbooked mothers who did not attend at least two antenatal clinics two weeks before giving birth and has no booking bloods taken but delivered at the VVH during the study period (01 April 2008 to 31 March 2009). Those delivered by private medical practitioners were considered as booked. Therefore no sampling was done.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data for this study are routinely collected for the DHIS. Data from the DHIS was extracted using the MS Excel based data collection tool. These tools were designed specifically for this study.

3.6.2 STUDY INSTRUMENT

Data relevant to this study is routinely collected electronically for the District Health Information system (DHIS). Information was extracted from the DHIS using the data extraction sheet designed for this study (Appendix B).

3.6.3 VARIABLES

Variables that were used with their indicators for each objective are listed as Table 3.2 below:

- Prevalence of unbooked mothers
- Profile (Demographic and Clinical) of patients
- Booking status of patients
- Maternal and neonatal outcomes

3.6.4 DATA ANALYSIS

Data was captured with MS Excel software and was analysed with NCSS software (NCSS, 2007). Following statistics were used for this study:

- Descriptive statistics: Central tendency (mean or median) and spread [standard deviation (SD) or interquartile range (IQR)] were used to analyse the numerical data. Proportions and ratios were used to analyse categorical data.
- Analytical statistics such as t-test were used to compare between two groups (such as booked and unbooked mothers). Multivariate analysis

was done to determine the effects of multiple variables on maternal and neonatal outcomes.

3.7 PILOT STUDY

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

3.8 ETHICAL CONSIDERATIONS

Permission for conducting research and accessing documents was sought from the head of the department of the Limpopo Provincial Department of Health. The study was also approved by the University of the Witwatersrand Human Research Ethics Committee (Medical) before the commencement of the study (Appendix A). Confidentiality and anonymity was maintained during collection, capturing, and reporting of the information. Patients' name and hospital numbers were not recorded in the data collection form and database.

CHAPTER 4

RESULTS

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

4.1 NUMBER OF PATIENTS DELIVERED AT THE HOSPITAL

The total number of deliveries during the study period is described in the Table 4.1. Total number of deliveries during this period was 593. The mean number of deliveries was 49 (\pm 18).

Table 4.1 Number of deliveries at the Hospital during one year

	No of deliveries n (%)	Booked (n %)	Unbooked n (%)
April 2008	71	54 (76.1%)	17 (23.9%)
May 2008	74	62 (83.8%)	12 (16.2%)
June 2008	72	59 (81.9%)	13 (18.1%)
July 2008	31	21 (67.7%)	10 (32.3%)
August 2008	26	20 (76.9%)	6 (23.1%)
September 2008	29	26 (89.7%)	3 (10.3%)
October 2008	66	57 (86.4%)	9 (13.6%)
November 2008	36	32 (88.9%)	4 (11.1%)
December 2008	50	44 (88%)	6 (12%)
January 2009	53	47 (88.7%)	6 (11.3%)
February 2009	37	36 (97.3%)	1 (2.7%)
March 2009	48	42 (87.5%)	6 (12.5%)
Total	593 (100%)	500 (84.3%)	93 (15.7%)

Among these patients, 500 (84.3%) were booked and 93 (15.7%) were unbooked (Figure 4.1). The proportion of mothers who were booked varied from 67.7% to 97.3%.

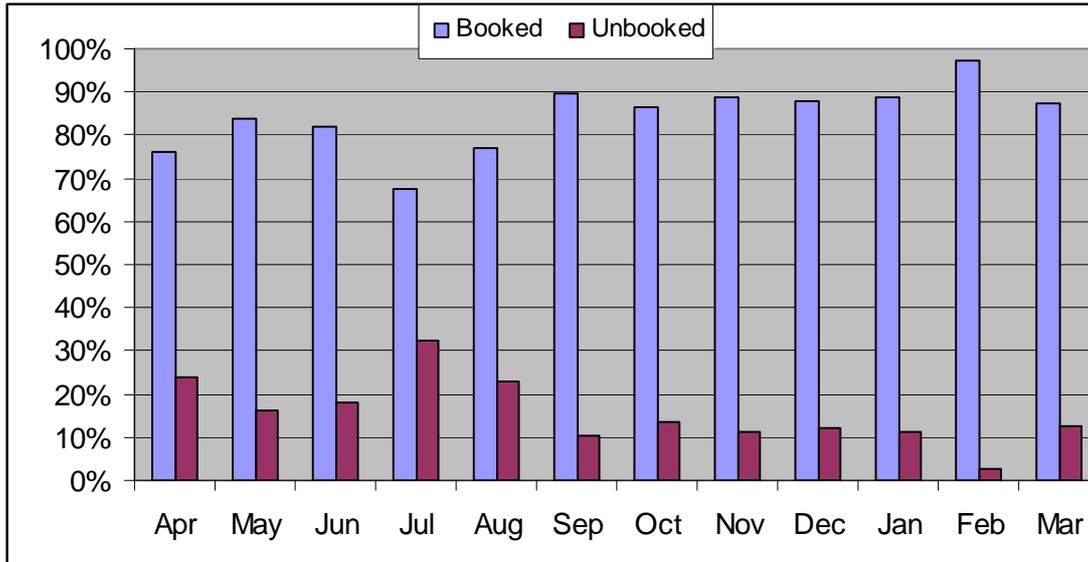


Figure 4.1 Booked and Unbooked mothers (n =593)

4.2 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

4.2.1 AGE

The age distribution of the subjects was described in Table 4.2. The age was not normally distributed. The median age was 25 (IQR 21-31) There was no significant differences in age between the booked and unbooked mothers (Mann Whitney’s U test, p=0.15).

Table 4.2 Age of the subjects

Age in years	Total	Booked	Unbooked
Median	25 (21 – 31)	25 (21 – 31)	26 (22-34)
Interquartile range			
Range	(14 – 47)	(14 – 47)	(14-46)

Seventy eight (13.2%) of them were teenagers (\leq : 19 years of age). 66 (13.2%) of them were booked and 12 (12.9%) were unbooked.

4.2.2 ETHNICITY

The ethnicity of the patients is described in Table 4.3. There was a significant association between booking status and ethnicity (Mann Whitney's U test $P < 0.0001$). More whites patients were found to be unbooked than black patients.

Table 4.3 Ethnicity of the subjects

Ethnicity	Total	Booked	Unbooked
African	582 (98%)	495 (85.1%)	87 (19.9%)
White	11 (2%)	5 (4.5%)	6 (59 %)
Total	593 (100%)	500 (100%)	93 (100%)

4.2.3 MARITAL STATUS

The marital status of the subjects was described in Table 4.4. There was no significant difference between the booked and unbooked mothers in terms of their marital status (Mann Whitney's U test, $p = 0.98$).

Table 4.4 Marital status

Marital status	Total No of deliveries n (%)	Booked (n %)	Unbooked n (%)
Single	18 (31%)	156 (31.2%)	28 (31%)
Married	39 (66.8%)	33 (66.8%)	63 (66.9%)
Widowed	5 (0.8%)	4(0.8%)	1 (1.1%)
Divorced	7 (1.2%)	6 (1.2%)	1(1.1%)
TOTAL	593 (100%)	500 (100%)	93 (100%)

4.2.4 EMPLOYMENT STATUS

The employment of the subjects was described in Table 4.5. There was no significant association between booking and employment status (Chi-square test, $p=0.89$).

Table 4.5 Employment status

Employment status	Total	Booked	Unbooked
Employed	51 (86.7%)	67 (13.4%)	12 (12.9%)
Unemployed	79 (13.3%)	433 (83.6%)	81 (87.1)
TOTAL	593 (100%)	500 (100%)	93 (100%)

4.3 CLINICAL PROFILE OF PATIENTS

4.3.1 PARITY AND GRAVIDITY OF THE SUBJECTS

The parity of the subjects was described in Table 4.6. There was no significant difference between the booked and unbooked mothers in terms of parity (Mann Whitney's U test, $p = 0.14$).

Table 4.5 Parity and gravidity of the subjects

Parity	Total	Booked	Unbooked
Median (IQR)	1 (0 – 2)	1(0 – 2)	1 (0 – 2)
Range	(0 – 8)	(0 – 8)	(0 – 6)
Gravidity			
Median (IQR)	2 (1 – 3)	2 (1 – 3)	2 (1-3)
Range	(0 – 10)	(0 – 10)	(0 – 7)

The gravidity of the subjects was described in Table 4.5. There was no significant difference between the booked and unbooked mothers in terms of gravidity (Mann Whitney's U test, $p =0.13$).

4.3.2 PREVIOUS HISTORIES OF MISCARRIAGES

The number of miscarriages among the subjects was described in Table 4.6. Twenty-eight patients (4.7%) had miscarriages. Eight of them had more than one miscarriage. There was no significant association between previous history of miscarriages and booking status (Chi-square test, $p = 0.12$).

Table 4.6 Previous histories of miscarriages

Miscarriages	Total	Booked	Unbooked
Yes	28 (4.7%)	21 (4.2%)	7 (7.5%)
No	565 (95.3%)	479 (95.8%)	86 (92.5%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.3 GESTATIONAL AGE AT BOOKING

Among the mothers who were booked, mean gestational age at first booking was 23 weeks (± 5 weeks).

4.3.4 GESTATIONAL AGE AT DELIVERY

The gestational age at delivery of the subjects was described in Table 4.7. There was significant association between booking status and preterm babies (Chi-square test, $p < 0.05$), as there were more preterm deliveries among the unbooked mothers.

Table 4.7 Gestational age at delivery

Gestational age in weeks	Total	Booked	Unbooked
Term	589 (98.5%)	495 (99.0)	89 (95.7%)
Preterm	9 (1.5%)	5 (1%)	4 (4.3%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.5 INDUCTION OF LABOUR

Only one patient (booked) had an induction of labour.

4.3.6 MODE OF DELIVERY

The mode of delivery of the subjects was described in Table 4.8. There was a significant association between mode of delivery and booking status (Chi-square test, $p < 0.02$). The C/S rate was high among the unbooked mothers.

Table 4.8 Mode of delivery

Mode of delivery	Total	Booked	Unbooked
Breech	8 (1.3%)	5 (1%)	3 (3.2%)
C/S	140 (23.6%)	109 (21.8%)	31 (33.3%)
NVD	428 (72.2%)	372 (79.9%)	56 (60.2%)
Vacuum	17 (2.9%)	14 (2.8%)	3 (3.4%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.7 COMPLICATIONS AT DELIVERY

The complicated deliveries of the subjects were described in Table 4.9. There were no significant differences between booked and unbooked mothers in terms of delivery complications (Chi-square test, $p < 0.50$).

Table 4.9 Complications at delivery

	Total	Booked	Unbooked
No complications	456 (77%)	399 (78%)	69 (74%)
Complications	135 (33%)	111 (22%)	24 (26%)
Total	592 (100%)	500 (100%)	93 (100%)

The details of these complications are listed in Table 4.10.

Table 4.10 List of complications at delivery

Type	Total	Booked	Unbooked
1 st Degree tear	58	55	3
2 nd Degree tear	4	3	1
3 rd Degree tear	1	1	0
Vaginal tear	1	0	1
Labial tear	2	1	1
Cervico-vaginal lacerations	29	24	5
VVF	1	0	1
Cervical dystocia	1	1	0
Prolonged 2 nd Stage	1	1	0
Poor Progress	5	4	1
Failed induction	1	0	1
Intra-partum haemorrhage	1	1	0
Severe pregnancy induced hypertension	2	1	1
Eclampsia	1	1	0
Cord prolapse	4	0	4
Failed vacuum	1	0	1
Foetal Distress	20	18	2
Footling Breech	1	0	1
Hand prolapse	1	0	1
Total	135	111	24

There were no post-partum complications among the study population.

4.4 PERINATAL PROFILE

4.4.1 BIRTH WEIGHT

The birth weight on the babies was described in Table 4.11. There was no significant difference between booked and unbooked mothers in terms of birth weight (Mann Whitney's U test $p=0.88$).

Table 4.11 Birth weight

Birth weight in kg	Total	Booked	Unbooked
Median (IQR)	3.06 (2.76 – 3.39)	3.06 (2.76 – 3.30)	3.02 (2.76 – 3.4)
Range	(1.82 – 4.76)	(1.9 – 4.76)	(1.82 – 4.26)

4.4.2 APGAR SCORES

The Apgar scores (1 and 10 minutes) of the neonates were described in Table 4.12. There was a significant difference between booked and unbooked mothers in terms of Apgar score at 1 minute (Mann Whitney's U test $p=0.03$) but not so significant for Apgar score at 10 min (Mann Whitney's U test $p=0.06$). This implies babies of booked mother had significantly high Apgar score (1 min). However, the difference became insignificant at 10 min.

Table 4.12 Apgar score

Apgar score	Total	Booked	Unbooked
Apgar score- 1 min			
Median (IQR)	9 (9-9)	9 (9-9)	9 (9-9)
Range	(3-10)	(3-10)	(3-10)
Apgar score- 10 min			
Median (IQR)	10 (10-10)	10 (10-10)	10 (10-10)
Range	(8-10)	(9-10)	(8-10)

4.5 FINAL OUTCOME

4.5.1 MATERNAL OUTCOME

There was no maternal mortality during this study period. All mothers were discharged home.

4.5.2 PERINATAL OUTCOME

The perinatal outcome for the subjects was described in Table 4.13. There was no significant difference between the booked and unbooked mothers (Chi-square test, $p=0.29$).

Table 4.13 Perinatal outcome

Outcome	Total	Booked	Unbooked
Alive	567 (95.6%)	480 (96%)	87 (93.5%)
FSB	8 (1.3%)	7 (1.4%)	1 (1.1%)
MSB	7 (1.3%)	5 (1%)	2 (2.2%)
Died	11 (1.8%)	8 (1.6%)	3 (3.7%)
Total	593 (100%)	500 (100%)	93 (100%)

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 booked and unbooked mothers who delivered at a district hospital (Van Velden Hospital) during one year study period (1st April 2008 to 31st March 2009). No studies have been conducted at the level of a district hospital in a rural setting in the Limpopo Province to look at the influence of booking status on pregnancy outcomes.

5.2 STUDY POPULATION

The study population included 593 records of booked (500, 84.3%) and unbooked (n=93, 15.7%) mothers who delivered at the VVH during the study period (01 April 2008 to 31 March 2009). Records of all the patients who delivered at the Hospital during the study period. The study documented a significant number of unbooked mothers, which was similar to findings of previous studies conducted in South Africa (Larsen and van Middelkoop, 1982; Pattinson and Rossouw, 1987).

5.3 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

There are a number of socio-demographic factors that are found to be associated with booking status. These factors include: young age, being a single parent, low socio-economic status, unemployment, and time constraints and for some women, the distance away from the health care facility contributes to being un-booked (Larsen and van Middelkoop, 1982; Blondel, et al, 1993; Mutihir and Nyiputen, 2007; Beeckman, Louckx, Putman, 2010; Gaunt, 2010). However, this study found no significant differences in age,

marital and employment status of the patients. There was a significant number of teenage pregnancies (13.2%) among the study population, which is of concern. However, contrary to popular belief, there was no significant association between booking status and teenage pregnancy.

Beeckman, et al (2010) found an association between booking status in Brussels. Interestingly, this study found significantly more white women in the unbooked category ($p < 0.0001$). However, there was no significant association between employment status and ethnicity (Chi-square test, $p = 0.53$). Therefore, it can be postulated that they probably attended private doctors for antenatal care but came to deliver at the Hospital.

5.4 CLINICAL PROFILE OF PATIENTS

There are a number of clinical factors that are found to be associated with booking status reported in the previous studies. These factors include: both primigravidae, multigravidae, (Blondel, et al, 1993; Mutahir and Nyiputen, 2007), and previous medical history (Beeckman, et al., 2010). In other studies, previous operative deliveries were found to have no influence on booking status (Larsen and van Middelkoop, 1982). The study found no significant differences in parity, gravidity and miscarriages between the two groups. However, unbooked mothers were more likely to have a preterm baby ($p < 0.05$). This implies that antenatal booking may prevent preterm deliveries from occurring.

This study also found unbooked mothers were more likely to have C/S than booked mothers ($p < 0.02$). However, there was no significant difference between booked and unbooked mothers in terms of complications ($p < 0.50$). There were no referrals to level 2 or 3 hospitals, during the period of study.

5.5 PERINATAL PROFILE

There was no significant difference between booked and unbooked mothers in terms of birth weight (Mann Whitney's U test $p=0.88$). Although, the babies of unbooked mothers had a significantly lower Apgar score at 1 minute ($p=0.03$), the difference was not so significant for Apgar scores at 10 minutes ($p=0.06$). This coincides with the findings of this study, which demonstrated that there were more preterm deliveries among the unbooked mothers.

5.6 FINAL OUTCOME

Among the study population, there was no maternal mortality during this study period. All mothers were discharged home. There was no significant difference in perinatal mortality between the booked and unbooked mothers (Chi-square test, $p=0.29$).

CHAPTER 6

CONCLUSION 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 were 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 influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province.

6.1.1 PREVALENCE OF UNBOOKED MOTHERS WHO DELIVERED AT THE MATERNITY UNIT DURING THE STUDY PERIOD

The prevalence of unbooked mothers among the study population was 15.7% (n=93), which varied between 2.7% and 32.3% during the 12 month study period.

6.1.2 SOCIO-DEMOGRAPHIC AND CLINICAL PROFILE

The study found no significant differences in socio-demographic profile between booked and unbooked mothers except ethnicity. There were significantly more white women in the unbooked category. This study reported 13.2% teenage pregnancies among the study population, which is of concern. However, contrary popular belief, there was no significant association between booking status and teenage pregnancy.

The study found no significant differences in clinical profile between booked

and unbooked mothers except preterm labour and mode of delivery. Unbooked mothers were more likely to have a preterm baby and C/S deliveries. This implies antenatal booking can probably prevent preterm deliveries.

Although, the babies of unbooked mothers had a significantly lower Apgar score (1 min), the difference became insignificant at 10 min.

6.1.3 DETERMINATION OF THEIR OUTCOMES

There was no maternal mortality during this period. All mothers were discharged home. Perinatal mortality among the study population was 44/1000 birth. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

6.2 POSSIBLE LIMITATIONS OF THE STUDY

The limitations of the study were as follows:

1. There were missing information from 10 records in the electronic data base. This information was retrieved from the manual records.
2. This was cross-sectional study. A long term prospective study is necessary to understand the long term impact on the babies.
3. No primary data collection was done for this study.

6.3 RECOMMENDATIONS

The recommendations made below were based on the findings from this study as well as from the Maternity Unit staff. The analysis of the data also revealed some areas that need to be evaluated and recommendations were made based on the results of this study. Recommendations for further or more in depth research were also highlighted.

6.3.1 FOLLOW UP

Maternal health is currently a priority for the Limpopo Department of Health and Social Development. This study would hopefully assist the Province to develop an understanding of prevalence and impact of unbooked mothers on the maternal health services. Outcomes of the research will be presented to the district and provincial management of the Department of Health in Limpopo Province with the view of creating a model that can be used and rolled out to other hospitals with similar challenges in a rural setting.

6.3.2 FUTURE RESEARCH

The researcher would like to propose a long-term prospective study that would involve interviewing unbooked mothers to develop an understanding of the challenges faced by these women in that area.

6.4 SUMMARY AND CONCLUSIONS

This is the first study that looked at broad issues pertaining to the influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province and probably in South Africa. The study found a prevalence of 15.7% (range: 2.7% and 32.3%) unbooked mothers among the study population during the 12 month study period. There were no significant differences in socio-demographic profiles except ethnicity. There were no significant differences in clinical profile except preterm delivery and mode of delivery. This implies antenatal booking can probably prevent preterm deliveries. There was no maternal mortality during this period. All mothers were discharged home. Perinatal mortality among the study population was 44/ 1000 birth. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

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APPENDICES

**APPENDIX A: ETHICS CLEARANCE CERTIFICATE
AND LETTERS OF PERMISSION**

APPENDIX B: DATA COLLECTION SHEET

**COMPARISON OF PREGNANCY OUTCOME BETWEEN BOOKED AND
UNBOOKED MOTHERS AT VAN VELDEN HOSPITAL
IN THE LIMPOPO PROVINCE**

ELLEN LOPANG MADIKE

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, 2010

DECLARATION

I, Ellen Lopang Madike, 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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November 2010

DEDICATION

I would like to take gratitude, and acknowledge the support given to me during my years of study by my family. Firstly, I would love to thank my husband, Gregory for the support he gave me even though it was restricted and hindered by certain events, the injuries he endured in a car accident and I was away most of the times when he needed me the most. Hence, he is strong enough, he pulled through. Not forgetting the patience and love my children exercised throughout my studies, even though I was hardly there for them, to employ my role as a mother they did not love me any less. Daisy and Fabia having excelled as mother figures for their families and siblings in my absence, am proud of my girls. Augustine and Magdalene whom were both at school, at a critical point of their studies, Augustine beginning his tertiary studies and Magdalene completing her high school studies. Am conceited of them, for making it without my help.

ABSTRACT

BACKGROUND: The World Health Organization (WHO) has acknowledged the importance of maternal care and listed it as part of its Millennium Development Goals (MDGs). South Africa has aligned itself with these MDGs. The 5th goal is focused on improving maternal health by reducing the maternal mortality rate by 75% by 2015. There are a number of interventions in place to try and to achieve this goal; the provision of antenatal care is one of these interventions. Antenatal care provides the expectant mother early ongoing monitoring and risk assessment of her pregnancy. It is commonly considered fact that antenatal care improves maternal and perinatal outcomes. In spite of the provision of free maternal health services in South Africa, there are still a significant number of mothers who do not attend antenatal clinics before delivery. No formal study has been done to understand the magnitude of this problem in the Limpopo Province. In view of this, it was decided to conduct this study at the Van Velden Hospital (a rural district hospital in the Mopani District in the Limpopo Province) which has been admitting a significant number of unbooked mothers even after the introduction of free maternal health services in South Africa sixteen years ago.

AIM: To compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at Van Velden Hospital, a district hospital in the Limpopo Province in South Africa.

METHODOLOGY: The setting of this study is the Maternity Unit at the Van Velden Hospital. A cross sectional study design was used. A retrospective record review was done and information for one year (2008/09) will be extracted from the records captured in the District Health Information System. No primary data was collected for this study.

RESULTS: This is the first study that looked at broad issues pertaining to the influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province and probably in South Africa. The study found a prevalence of 15.7% (range: 2.7% to 32.3%) among the study population during the 12 month study period. There were no significant differences in age, marital and employment status of the subjects. However, there were a significant number of teenage pregnancies (13.2%)

among the study population, which is of concern. Interestingly, more white women were found not to book in comparison to the black women. There were no significant differences in parity, gravidity and miscarriages between the two groups. Overall, unbooked mothers were more likely to have a preterm baby. This implies antenatal booking can probably prevent preterm deliveries. This study also found unbooked mothers were more likely to have C/S than booked mothers. However, there was no significant difference between booked and unbooked mothers in terms of delivery complications. There was no significant difference between booked and unbooked mothers in terms of birth weight. Although, the babies of unbooked mothers had a significantly lower Apgar score (1 minute) than booked mothers, the difference became insignificant at 10 minutes. There was no maternal mortality during this period. All mothers were discharged home. Overall, perinatal mortality among the study population was 44/ 1000 births. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

CONCLUSION: This research was undertaken to develop a model that could be used by both the provincial and national governments to evaluate the prevalence and impact of booking status of pregnant women in rural district hospitals in South Africa.

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GLOSSARY OF TERMS

Antenatal care: Antenatal care is care of a pregnant woman during the time in the maternity cycle that begins with conception and ends with the onset of labour.

Booked mother: A woman who has attended at least two antenatal clinics at least two weeks before giving birth at which booking bloods have been taken (WHO, 2009).

Booking bloods: Routine screening blood tests done on all mothers attending antenatal clinics. These include the haemoglobin level, serological investigation for syphilis (reactive plasma reagent). Rhesus typing and an HIV rapid test (with the mother's permission) (WHO, 2009)

Delivery attended by skilled health professional: Number of deliveries attended by skilled health care personnel (HST, 2009).

District Hospital: A level one hospital offering primary health care services.

Maternal mortality rate: Maternal deaths per 100,000 live births. (HST, 2009)

Rural hospital: A hospital situated within the rural communities, having no municipal infrastructure (waste removal and bulk water supply).

Un-booked mother: A mother who did not attend at or attend less than two antenatal clinics within stipulated period (WHO, 2009).

LIST OF ABBREVIATIONS

CEO	Chief Executive Officer
CHC	Community Health Centre
CS	Caesarean section
DHS	District Health System
DHIS	District Health Information System
GP	General Practitioner
HOD	Head of the Department
MMR	Maternal Mortality Rate
VVH	Van Velden Hospital
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

The purpose of this study was to compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at a district hospital in the Limpopo Province in South Africa. 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

The WHO recommends use of the district model for maternal healthcare delivery. Within a health district of 500,000, the WHO recommends at least four facilities offering basic emergency care and one facility offering comprehensive emergency obstetric care (UNICEF, 1997). In South Africa, the community health centres (CHC) and fixed and mobile primary health care facilities offer basic maternity care, whereas district and regional hospitals are expected to offer comprehensive maternity care. 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, whereas complicated cases are referred to either a district hospital or a regional or tertiary hospital, if they require specialist intervention.

Free maternal health services were introduced in 1994 (Republic of South Africa, 1994). However, a study done in 1998 found a significant number of women did not access antenatal care before delivery (Fonn, Xaba, Tint, et al., 1998). The researcher perceived that the situation has remained the same even after 15 years.

1.2 JUSTIFICATION OF THIS STUDY

Van Velden Hospital is a rural district hospital in the Mopani District in the Limpopo Province. It is situated in Tzaneen town which is in Greater Tzaneen Local Municipality. It serves eight clinics on the north – eastern part of the District, which refers patients to this Hospital. The perception of the Hospital management was that the Maternity Unit of the Hospital has been admitting increasing numbers of unbooked mothers over the past few years. However, the Hospital management is not clear about the effect of this increasing number of unbooked mothers on the Hospital service delivery and their pregnancy outcomes. Therefore, the researcher would like to systematically analyse the routinely collected data from the District Health Information system to determine the prevalence of unbooked mother and their pregnancy outcomes. The study hopes to provide the Hospital and Limpopo provincial management with input in relation to the prevalence of unbooked mothers and their pregnancy outcomes in a rural setting.

1.3 RESEARCH QUESTION

What are the differences in the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at the Van Velden Hospital during the period 1st April 2008 to 31st March 2009?

1.4 STUDY OBJECTIVES

1.4.1 BROAD OBJECTIVE

To compare the pregnancy outcomes (maternal and perinatal) between booked and unbooked mothers who delivered at Van Velden Hospital during the period 1st April 2008 to 31st March 2009.

1.4.2 SPECIFIC OBJECTIVES

1. To determine the prevalence of unbooked mothers during the study period (April 2008 to March 2009).
2. To determine the profile of mothers (booked and unbooked) who delivered at the Maternity Unit during the study period as regards to the following:
 - 2.1 Demographic profile (age, ethnicity)
 - 2.2 Booking status (booked/ unbooked)
 - 2.3 Obstetric profile (Ante-partum: parity, past obstetric history), Intra-partum (Induction, mode of delivery, complications at delivery), Post-partum (complications)
 - 2.4 Perinates: birth weight, and Apgar score
 - 2.5 Final outcome: Mother and Baby
3. To compare the profiles and final outcomes of booked and unbooked mothers for the same period

1.5 SUBSEQUENT CHAPTERS

So far, the background to the research has been discussed. Then, research question and objectives were defined in this first chapter. 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

LITERATURE REVIEW

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

2.1 MATERNAL HEALTH

Maternal health refers to the health of women during pregnancy, childbirth and the postpartum period. While motherhood is often a positive and fulfilling experience, it is associated with suffering, ill-health and even death for too many women. There is little information about maternal health and morbidity in many countries and, therefore, maternal mortality is often used as a proxy indicator for maternal health (Filippi, Ronsmans, Gohou, et al., 2005). Every minute, at least one woman dies from complications related to pregnancy or childbirth i.e. 529,000 women per year. In addition, for every woman who dies in childbirth, around 20 more suffer injury, infection or disease – approximately 10 million women each year (WHO, 2009). Five direct complications that account for more than 70% of maternal deaths are: haemorrhage, infection, unsafe abortion, eclampsia and obstructed labour. This did not change during the 12 year period from 1988 to 2000 (Khan, Wojdyla, Say, et al, 2006) and even during the last decade (WHO, 2009).

Unavailable, inaccessible, unaffordable, and/or poor quality care are fundamentally responsible for maternal deaths worldwide. These deaths are detrimental to social development and well-being, as some one million children are left motherless each year. These children are 10 times more likely to die within two years of their mothers' death (WHO, 2005).

2.2 MATERNAL HEALTH SERVICES IN DEVELOPED COUNTRIES

The importance of maternal health care is acknowledged nationally and internationally and listed among one of the Millennium development goals (WHO, 2004). For last few decades, maternal health care became one of the key points in the health care service deliveries in developed countries and because of that, these countries achieved significant results in terms of reduction of maternal mortality and morbidity. For example in Australia, the Western Australian Department of Health developed integrated and responsive maternal health care services that can be adapted according to the individual need of the patients in their own settings ((Western Australian Department of Health, 2007). In the United Kingdom, maternal care is available to all women (The House of Commons, 2003).

2.3 MATERNAL HEALTH SERVICES IN DEVELOPING COUNTRIES

The situation is different in developing countries. In these countries, maternal mortality and morbidity remain high. However, many countries have taken important steps to address this problem.

In Tanzania, Jahn, Kowalewski and Kimatta (1996) reported that despite pursuing the risk approach and good antenatal coverage, antenatal care in Tanzania has only limited effect on extending obstetric care to high-risk mothers. In Zambia, the Department of Health has taken necessary steps to provide a patient-centred family orientated maternal health care services based on “Making pregnancy safer initiative’ of WHO (Maimbolwa, 2004). In Mozambique, the Department of Health introduced a patient friendly community participation approach by involving the patients, their families and communities (Sundby, Rwanmushaija and Usta, 2002).

Although the effect of these newer initiatives on maternal mortality and morbidity is yet to be seen, there are some evidences emerging. For example, in Ghana, utilization of maternal health services was found to be directly associated with reduction in maternal and neonatal mortality (Ansong-Tomui,

Amar-Klenesa, Arhinful, et al., 2007). In Botswana, the number of syphilis cases were declining because of compulsory checking of Rapid Plasma Reagin (RPR) test during antenatal attendance (Creek, Thuku, Kolou, et al., 2005).

2.4 MATERNAL HEALTH SERVICES IN SOUTH AFRICA

In South Africa, maternal and child care always remained as key priority areas for the Government. The South African government also introduced free maternal care in 1994 (Republic of South Africa, 1994). The Maternal child and women's health is currently one of the strategic goals for the current strategic plan (Department of Health, 2009). As a part of that process, the Minister of Health established National Committee for Confidential Enquiries into Maternal Deaths. This Committee has produced four reports till date. These reports critically analyse the maternal mortality in South Africa and provide valuable recommendations. However, most of these recommendations remained same for the last decade and not much progress has been made for implementation of these recommendations at the facility level. Poor record-keeping, inadequate supervision, poor levels of clinical knowledge and under-utilisation of midwife obstetric units were some of the challenges identified for maternal health services in South Africa (Thomas, Jina, Tint, et al., 2007)

Maternity cases in South Africa are managed in different levels of health care (primary, secondary or tertiary) according to the risk category of patients. Patients are classified into no risk, low risk, medium risk and high risk. Based on the classifications, the cases are managed at appropriate level of care. This risk classification is expected to guide the management of cases at the health facilities. This arrangement is expected to improve maternal services and maternal and perinatal outcomes (Farrell and Pattinson, 2005). However, a similar study done in Zimbabwe did not find the usefulness of risk scores (Majoko, Nyström, Munjanja, et al. 2002).

Recently, the Perinatal Mother to Child Transmission (PMTCT) Programme became an integral part of maternal health services. Adequate management of HIV in pregnancy is key to the successful implementation of maternal health services due to a high prevalence of HIV in this country (Hoque, Hoque and Kader, 2008).

2.5 ANTENATAL CARE

Antenatal care is identified as one of the key programmes for improvement of maternal health not only in South Africa but also rest of the world.

Antenatal care is an intervention aimed at pregnant women to ensure the best possible outcome for both the mother and the baby. The World Health Organization (WHO) recommends antenatal care to be one of the interventions aimed at decreasing maternal and perinatal mortality and it recommends at least four visits for an adequate level of antenatal care (WHO, 2009). Women should book as soon as pregnancy is detected which could be as early as six weeks of gestation in order to be screened for any pregnancy related problems, to review the risk of the pregnancy and to make provision for medications that may improve the pregnancy outcome (Cronje and Grobler, 2003; WHO, 2009). A woman is generally considered to be booked if she has had at least two clinic visits at least two weeks before giving birth and had booking bloods taken at the first visit. Despite all the advantages of regular antenatal care, late bookings and missed visits still occur in South Africa. There are still some pregnant women who present to the health facility to deliver without ever attending any antenatal care. Some of the reasons for late bookings include the following: young age, primigravidae, multigravidae, being a single parent, low socio-economic status, unemployment, and time constraints and for some women, the distance away from the health care facility contributes to being un-booked (Blondel, Dutil, Delour, et al, 1993; Mutihir and Nyiputen, 2007).

Booked women are found to get early, ongoing monitoring and a continuous risk assessment (Fiscella, 1995). This includes health education, information

about self-care in pregnancy, danger signs and symptoms of pregnancy. The antenatal care could address a delivery plan with an estimated date, place and mode of delivery for the current pregnancy and allow for planning of future pregnancies and contraception use. If indicated, additional tests, nutritional supplements and treatment of medical problems could be commenced. Antenatal care also has the additional advantage of ensuring that a woman is attended to by a skilled healthcare professional during pregnancy and labour which is an important point of entry in the prevention of mother to child transmission of HIV (Abou-Zahr and Wardlaw, 2003). On the other hand, unbooked pregnant women were found to be twice at risk of operative delivery, four times more likely to suffer delivery complications and twice likely to have low birth weight babies when compared to booked patients (Okunlola, Owonikoko, Fawole, et al., 2008).

With regards to universal access to reproductive health, the provision of antenatal care is used as an indicator of access. The 2003 South African Demographic Health Survey (SADHS) reported antenatal attendance to be in the region of 92% for the pregnant population, which was slightly lower (94%) than the 1998 survey. About 5.3% of pregnant women never attended antenatal care and the remaining 2.7% had no knowledge of any antenatal care service provision. The majority (60%) of first antenatal visits occurred within the first 6 months of pregnancy. Approximately one quarter of women attended for the first time at between 6 and 7 months and almost 3% attended for the first time in their 8th month of pregnancy (Department of Health, 2007). The 2006 District Health Information System (DHIS) data reported antenatal coverage of 100% but some provinces (such as Gauteng, Kwa-Zulu Natal, Mpumalanga and Northern Cape) reported antenatal coverage of more than 100%, raising concerns about the quality of data. The same report described the average number of antenatal visits was 3.4 (Health Systems Trust, 2009).

Briggs (1988) studied a cohort of 10,665 deliveries in a hospital in Nigeria and found booking status was significantly associated with ante-partum and postpartum haemorrhage, severe anaemia, and undiagnosed medical and surgical complications. The author stressed the importance of antenatal care

as one of the key factors to a large-scale reduction in maternal mortality. Subsequently, another Nigerian study in a different hospital found 29% unbooked mother among a cohort of 1,154 deliveries. The study also found a significant association between booking status and occurrence of maternal complications (such as anaemia and ante-partum haemorrhage) and perinatal outcomes (such as preterm babies) (Owalabi, Fatusi, Adeyami, et al., 2008). However, a South African study found no difference in the perinatal mortality between booked and unbooked mothers, although there were higher rates of low birth weight and prematurity among the unbooked mothers (Ndiweni, and Buchmann, 1998). This study was in an urban setting (Soweto, Johannesburg) which may not be extrapolated to rural settings. Therefore, the researcher believes that this study would be able to address that gap.

2.6 ANTENATAL CARE BOOKING AND PROFILE OF PATIENTS

It is important to identify profile of unbooked patients and develop an understanding of the factors that might influence their inability to book during pregnancy.

Almost thirty years ago, Larsen and van Middelkoop (1982) conducted a study at the King Edward VIII Hospital, Durban and found that the unbooked mother was found to come more frequently from a background of unstable relationships, financial and emotional support and geographical inaccessibility. Unwanted babies and inadequate parenting arrangements were more frequent in this group. Previous operative deliveries were found to have no influence on booking status. A recent study done in Azerbaijan found women's education, socio-economic status, gravidity and desirability of the current pregnancy have a significant effect on antenatal care utilisation (Habibov, 2010). This was similar to findings of a study done in Brussels, where researchers found women's education, higher socio-economic status, low gravidity had a significant effect on higher antenatal care utilisation (Beeckman, Louckx, Putman, 2010). They also found ethnicity, and previous medical history played some role.

In addition to the patient related factors, assessing health care facilities may also play a role in antenatal care utilization. This is influenced by various factors such as transport from home, poor quality of services, attitude of health care providers (Gaunt, 2010).

Therefore, it is important to study both patient and health system related factors in a local setting to develop an understanding of antenatal care utilization in that area.

CHAPTER 3

METHODOLOGY

The methodology for this study was selected on the basis of its aims. The study design is presented first followed by setting and scope of the study, and data collection methods, research tools and data analysis. Finally, issues surrounding ethics are discussed.

3.1 STUDY DESIGN

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

3.2 STUDY SETTING

The study setting was the Maternity Unit of the Van Velden Hospital (VVH). The VVH is a district Hospital situated in the Greater Tzaneen Municipal area.

Mopani District Municipality

The Mopani District Municipality (DC33) is situated within the lowveld portion of the Limpopo Province. The district borders the bigger portion of the Kruger National Park, and is well known for its game and plantations. It consists of four Local Municipalities. The geographical area of the municipality is 11,097 km². The population in the District is 1 019 199: 46% (466 152) are male and 54% (553 047) female. The illiteracy level is high (241 873) and a significant number of people (705 336) are not married. The languages mainly spoken are Sepedi, Tsonga, Afrikaans and English. Most people are still travelling on foot, which hampers access to health services. Means of communication is mostly cell phones (53 528, 4%) and very few have land lines (0.4%). This makes the communication with patients difficult (Municipal Demarcation Board, 2009).

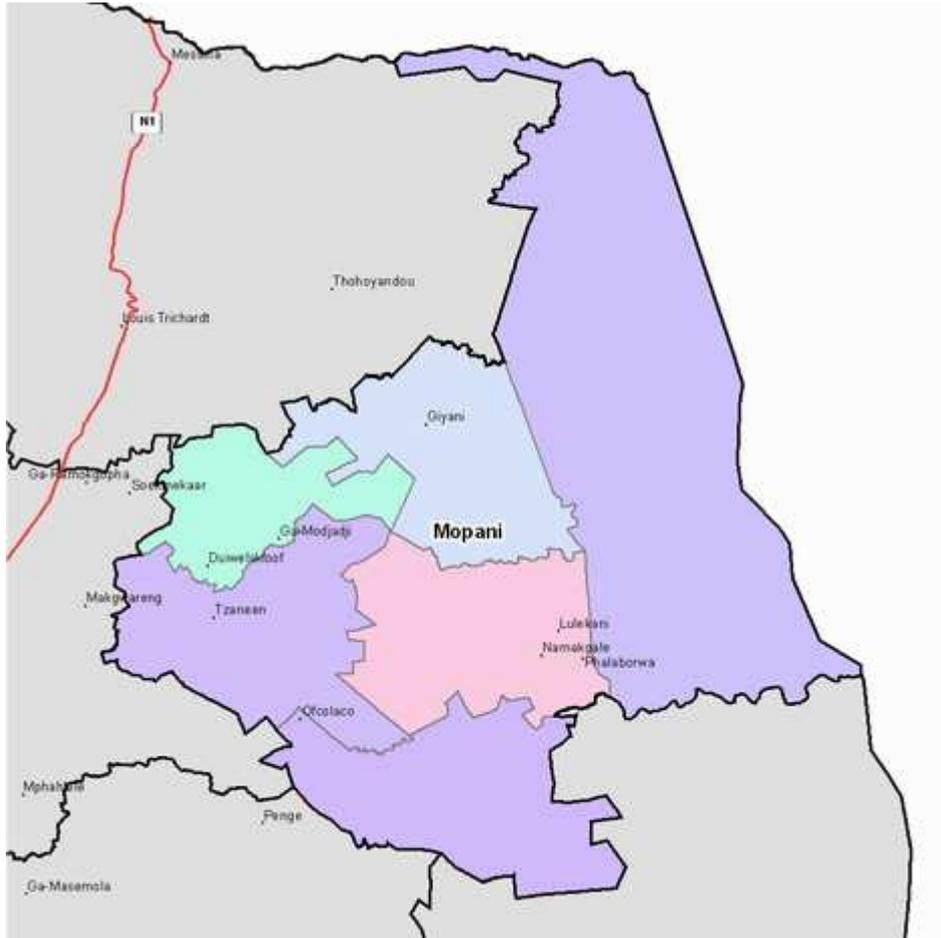


Figure 3.1 Mopani Health District

Van Velden Hospital

The Van Velden Hospital (VVH) is a District Hospital situated in the Greater Tzaneen Municipal area. It is 109 kilometres east of Polokwane. As part of the national policy, this Hospital forms part of the Mopani District Health System (DHS). This Hospital supports primary health care in the district and patients are referred from community health centres and clinics to district hospitals for level one (generalist) services to in-patients and outpatients. In some circumstances, primary health care services are rendered where there is no alternative source of this care within a reasonable distance (Department of Health, 2002). The Hospital is expected to manage low risk patients.

The Hospital has 86 in-patient beds. The maternity wards in the Hospital are listed in Table 3.1.

Table 3.1 In-patient wards in the Van Velden Hospital

Wards	Number of beds
Antenatal	5
Caesarean section	5
Post-Natal	10
Total	20

The Hospital has six medical doctors (general practitioners) and 66 nurses.

Among the nursing staff:

- 48 are professional nurses,
- 10 are staff nurses and
- 8 are auxiliary nurse.

3.3 STUDY SCOPE

The study was based on a retrospective review of the existing hospital electronic database. No primary data was collected for this study.

3.4 STUDY PERIOD

The period of this study was one year (1 April 2008 to 31 March 2009)

3.5 STUDY POPULATION AND SAMPLE

The study population included all records of booked mothers who has attended two antenatal clinics at least two weeks before giving birth, and those who attended medical practitioners in private at which booking bloods have been taken and unbooked mothers who did not attend at least two antenatal clinics two weeks before giving birth and has no booking bloods taken but delivered at the VVH during the study period (01 April 2008 to 31 March 2009). Those delivered by private medical practitioners were considered as booked. Therefore no sampling was done.

3.6 DATA MANAGEMENT

3.6.1 DATA COLLECTION

Data for this study are routinely collected for the DHIS. Data from the DHIS was extracted using the MS Excel based data collection tool. These tools were designed specifically for this study.

3.6.2 STUDY INSTRUMENT

Data relevant to this study is routinely collected electronically for the District Health Information system (DHIS). Information was extracted from the DHIS using the data extraction sheet designed for this study (Appendix B).

3.6.3 VARIABLES

Variables that were used with their indicators for each objective are listed as Table 3.2 below:

- Prevalence of unbooked mothers
- Profile (Demographic and Clinical) of patients
- Booking status of patients
- Maternal and neonatal outcomes

3.6.4 DATA ANALYSIS

Data was captured with MS Excel software and was analysed with NCSS software (NCSS, 2007). Following statistics were used for this study:

- Descriptive statistics: Central tendency (mean or median) and spread [standard deviation (SD) or interquartile range (IQR)] were used to analyse the numerical data. Proportions and ratios were used to analyse categorical data.
- Analytical statistics such as t-test were used to compare between two groups (such as booked and unbooked mothers). Multivariate analysis

was done to determine the effects of multiple variables on maternal and neonatal outcomes.

3.7 PILOT STUDY

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

3.8 ETHICAL CONSIDERATIONS

Permission for conducting research and accessing documents was sought from the head of the department of the Limpopo Provincial Department of Health. The study was also approved by the University of the Witwatersrand Human Research Ethics Committee (Medical) before the commencement of the study (Appendix A). Confidentiality and anonymity was maintained during collection, capturing, and reporting of the information. Patients' name and hospital numbers were not recorded in the data collection form and database.

CHAPTER 4

RESULTS

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

4.1 NUMBER OF PATIENTS DELIVERED AT THE HOSPITAL

The total number of deliveries during the study period is described in the Table 4.1. Total number of deliveries during this period was 593. The mean number of deliveries was 49 (± 18).

Table 4.1 Number of deliveries at the Hospital during one year

	No of deliveries n (%)	Booked (n %)	Unbooked n (%)
April 2008	71	54 (76.1%)	17 (23.9%)
May 2008	74	62 (83.8%)	12 (16.2%)
June 2008	72	59 (81.9%)	13 (18.1%)
July 2008	31	21 (67.7%)	10 (32.3%)
August 2008	26	20 (76.9%)	6 (23.1%)
September 2008	29	26 (89.7%)	3 (10.3%)
October 2008	66	57 (86.4%)	9 (13.6%)
November 2008	36	32 (88.9%)	4 (11.1%)
December 2008	50	44 (88%)	6 (12%)
January 2009	53	47 (88.7%)	6 (11.3%)
February 2009	37	36 (97.3%)	1 (2.7%)
March 2009	48	42 (87.5%)	6 (12.5%)
Total	593 (100%)	500 (84.3%)	93 (15.7%)

Among these patients, 500 (84.3%) were booked and 93 (15.7%) were unbooked (Figure 4.1). The proportion of mothers who were booked varied from 67.7% to 97.3%.

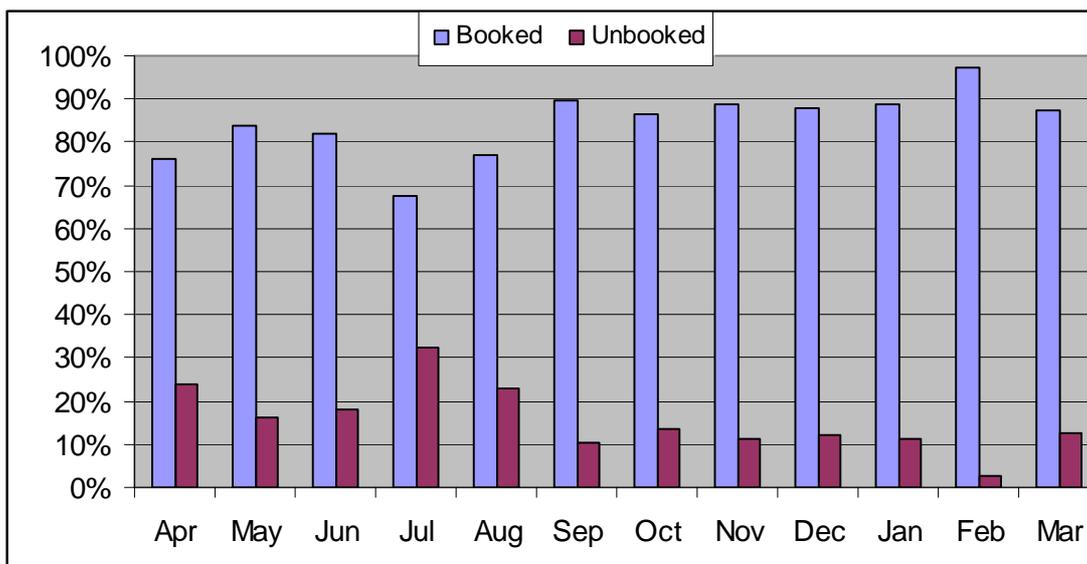


Figure 4.1 Booked and Unbooked mothers (n =593)

4.2 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

4.2.1 AGE

The age distribution of the subjects was described in Table 4.2. The age was not normally distributed. The median age was 25 (IQR 21-31) There was no significant differences in age between the booked and unbooked mothers (Mann Whitney’s U test, p=0.15).

Table 4.2 Age of the subjects

Age in years	Total	Booked	Unbooked
Median	25 (21 – 31)	25 (21 – 31)	26 (22-34)
Interquartile range			
Range	(14 – 47)	(14 – 47)	(14-46)

Seventy eight (13.2%) of them were teenagers (\leq : 19 years of age). 66 (13.2%) of them were booked and 12 (12.9%) were unbooked.

4.2.2 ETHNICITY

The ethnicity of the patients is described in Table 4.3. There was a significant association between booking status and ethnicity (Mann Whitney's U test $P < 0.0001$). More whites patients were found to be unbooked than black patients.

Table 4.3 Ethnicity of the subjects

Ethnicity	Total	Booked	Unbooked
African	582 (98%)	495 (85.1%)	87 (19.9%)
White	11 (2%)	5 (4.5%)	6 (59 %)
Total	593 (100%)	500 (100%)	93 (100%)

4.2.3 MARITAL STATUS

The marital status of the subjects was described in Table 4.4. There was no significant difference between the booked and unbooked mothers in terms of their marital status (Mann Whitney's U test, $p = 0.98$).

Table 4.4 Marital status

Marital status	Total No of deliveries n (%)	Booked (n %)	Unbooked n (%)
Single	18 (31%)	156 (31.2%)	28 (31%)
Married	39 (66.8%)	33 (66.8%)	63 (66.9%)
Widowed	5 (0.8%)	4(0.8%)	1 (1.1%)
Divorced	7 (1.2%)	6 (1.2%)	1(1.1%)
TOTAL	593 (100%)	500 (100%)	93 (100%)

4.2.4 EMPLOYMENT STATUS

The employment of the subjects was described in Table 4.5. There was no significant association between booking and employment status (Chi-square test, $p=0.89$).

Table 4.5 Employment status

Employment status	Total	Booked	Unbooked
Employed	51 (86.7%)	67 (13.4%)	12 (12.9%)
Unemployed	79 (13.3%)	433 (83.6%)	81 (87.1)
TOTAL	593 (100%)	500 (100%)	93 (100%)

4.3 CLINICAL PROFILE OF PATIENTS

4.3.1 PARITY AND GRAVIDITY OF THE SUBJECTS

The parity of the subjects was described in Table 4.6. There was no significant difference between the booked and unbooked mothers in terms of parity (Mann Whitney's U test, $p = 0.14$).

Table 4.5 Parity and gravidity of the subjects

Parity	Total	Booked	Unbooked
Median (IQR)	1 (0 – 2)	1(0 – 2)	1 (0 – 2)
Range	(0 – 8)	(0 – 8)	(0 – 6)
Gravidity			
Median (IQR)	2 (1 – 3)	2 (1 – 3)	2 (1-3)
Range	(0 – 10)	(0 – 10)	(0 – 7)

The gravidity of the subjects was described in Table 4.5. There was no significant difference between the booked and unbooked mothers in terms of gravidity (Mann Whitney's U test, $p =0.13$).

4.3.2 PREVIOUS HISTORIES OF MISCARRIAGES

The number of miscarriages among the subjects was described in Table 4.6. Twenty-eight patients (4.7%) had miscarriages. Eight of them had more than one miscarriage. There was no significant association between previous history of miscarriages and booking status (Chi-square test, $p = 0.12$).

Table 4.6 Previous histories of miscarriages

Miscarriages	Total	Booked	Unbooked
Yes	28 (4.7%)	21 (4.2%)	7 (7.5%)
No	565 (95.3%)	479 (95.8%)	86 (92.5%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.3 GESTATIONAL AGE AT BOOKING

Among the mothers who were booked, mean gestational age at first booking was 23 weeks (± 5 weeks).

4.3.4 GESTATIONAL AGE AT DELIVERY

The gestational age at delivery of the subjects was described in Table 4.7. There was significant association between booking status and preterm babies (Chi-square test, $p < 0.05$), as there were more preterm deliveries among the unbooked mothers.

Table 4.7 Gestational age at delivery

Gestational age in weeks	Total	Booked	Unbooked
Term	589 (98.5%)	495 (99.0)	89 (95.7%)
Preterm	9 (1.5%)	5 (1%)	4 (4.3%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.5 INDUCTION OF LABOUR

Only one patient (booked) had an induction of labour.

4.3.6 MODE OF DELIVERY

The mode of delivery of the subjects was described in Table 4.8. There was a significant association between mode of delivery and booking status (Chi-square test, $p < 0.02$). The C/S rate was high among the unbooked mothers.

Table 4.8 Mode of delivery

Mode of delivery	Total	Booked	Unbooked
Breech	8 (1.3%)	5 (1%)	3 (3.2%)
C/S	140 (23.6%)	109 (21.8%)	31 (33.3%)
NVD	428 (72.2%)	372 (79.9%)	56 (60.2%)
Vacuum	17 (2.9%)	14 (2.8%)	3 (3.4%)
Total	593 (100%)	500 (100%)	93 (100%)

4.3.7 COMPLICATIONS AT DELIVERY

The complicated deliveries of the subjects were described in Table 4.9. There were no significant differences between booked and unbooked mothers in terms of delivery complications (Chi-square test, $p < 0.50$).

Table 4.9 Complications at delivery

	Total	Booked	Unbooked
No complications	456 (77%)	399 (78%)	69 (74%)
Complications	135 (33%)	111 (22%)	24 (26%)
Total	592 (100%)	500 (100%)	93 (100%)

The details of these complications are listed in Table 4.10.

Table 4.10 List of complications at delivery

Type	Total	Booked	Unbooked
1 St Degree tear	58	55	3
2 nd Degree tear	4	3	1
3 Rd Degree tear	1	1	0
Vaginal tear	1	0	1
Labial tear	2	1	1
Cervico-vaginal lacerations	29	24	5
VVF	1	0	1
Cervical dystocia	1	1	0
Prolonged 2 nd Stage	1	1	0
Poor Progress	5	4	1
Failed induction	1	0	1
Intra-partum haemorrhage	1	1	0
Severe pregnancy induced hypertension	2	1	1
Eclampsia	1	1	0
Cord prolapse	4	0	4
Failed vacuum	1	0	1
Foetal Distress	20	18	2
Footling Breech	1	0	1
Hand prolapse	1	0	1
Total	135	111	24

There were no post-partum complications among the study population.

4.4 PERINATAL PROFILE

4.4.1 BIRTH WEIGHT

The birth weight on the babies was described in Table 4.11. There was no significant difference between booked and unbooked mothers in terms of birth weight (Mann Whitney's U test $p=0.88$).

Table 4.11 Birth weight

Birth weight in kg	Total	Booked	Unbooked
Median (IQR)	3.06 (2.76 – 3.39)	3.06 (2.76 – 3.30)	3.02 (2.76 – 3.4)
Range	(1.82 – 4.76)	(1.9 – 4.76)	(1.82 – 4.26)

4.4.2 APGAR SCORES

The Apgar scores (1 and 10 minutes) of the neonates were described in Table 4.12. There was a significant difference between booked and unbooked mothers in terms of Apgar score at 1 minute (Mann Whitney's U test $p=0.03$) but not so significant for Apgar score at 10 min (Mann Whitney's U test $p=0.06$). This implies babies of booked mother had significantly high Apgar score (1 min). However, the difference became insignificant at 10 min.

Table 4.12 Apgar score

Apgar score	Total	Booked	Unbooked
Apgar score- 1 min			
Median (IQR)	9 (9-9)	9 (9-9)	9 (9-9)
Range	(3-10)	(3-10)	(3-10)
Apgar score- 10 min			
Median (IQR)	10 (10-10)	10 (10-10)	10 (10-10)
Range	(8-10)	(9-10)	(8-10)

4.5 FINAL OUTCOME

4.5.1 MATERNAL OUTCOME

There was no maternal mortality during this study period. All mothers were discharged home.

4.5.2 PERINATAL OUTCOME

The perinatal outcome for the subjects was described in Table 4.13. There was no significant difference between the booked and unbooked mothers (Chi-square test, $p=0.29$).

Table 4.13 Perinatal outcome

Outcome	Total	Booked	Unbooked
Alive	567 (95.6%)	480 (96%)	87 (93.5%)
FSB	8 (1.3%)	7 (1.4%)	1 (1.1%)
MSB	7 (1.3%)	5 (1%)	2 (2.2%)
Died	11 (1.8%)	8 (1.6%)	3 (3.7%)
Total	593 (100%)	500 (100%)	93 (100%)

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 booked and unbooked mothers who delivered at a district hospital (Van Velden Hospital) during one year study period (1st April 2008 to 31st March 2009). No studies have been conducted at the level of a district hospital in a rural setting in the Limpopo Province to look at the influence of booking status on pregnancy outcomes.

5.2 STUDY POPULATION

The study population included 593 records of booked (500, 84.3%) and unbooked (n=93, 15.7%) mothers who delivered at the VVH during the study period (01 April 2008 to 31 March 2009). Records of all the patients who delivered at the Hospital during the study period. The study documented a significant number of unbooked mothers, which was similar to findings of previous studies conducted in South Africa (Larsen and van Middelkoop, 1982; Pattinson and Rossouw, 1987).

5.3 SOCIO-DEMOGRAPHIC PROFILE OF PATIENTS

There are a number of socio-demographic factors that are found to be associated with booking status. These factors include: young age, being a single parent, low socio-economic status, unemployment, and time constraints and for some women, the distance away from the health care facility contributes to being un-booked (Larsen and van Middelkoop, 1982; Blondel, et al, 1993; Mutihir and Nyiputen, 2007; Beeckman, Louckx, Putman, 2010; Gaunt, 2010). However, this study found no significant differences in age,

marital and employment status of the patients. There was a significant number of teenage pregnancies (13.2%) among the study population, which is of concern. However, contrary to popular belief, there was no significant association between booking status and teenage pregnancy.

Beeckman, et al (2010) found an association between booking status in Brussels. Interestingly, this study found significantly more white women in the unbooked category ($p < 0.0001$). However, there was no significant association between employment status and ethnicity (Chi-square test, $p = 0.53$). Therefore, it can be postulated that they probably attended private doctors for antenatal care but came to deliver at the Hospital.

5.4 CLINICAL PROFILE OF PATIENTS

There are a number of clinical factors that are found to be associated with booking status reported in the previous studies. These factors include: both primigravidae, multigravidae, (Blondel, et al, 1993; Mutihir and Nyiputen, 2007), and previous medical history (Beeckman, et al., 2010). In other studies, previous operative deliveries were found to have no influence on booking status (Larsen and van Middelkoop, 1982). The study found no significant differences in parity, gravidity and miscarriages between the two groups. However, unbooked mothers were more likely to have a preterm baby ($p < 0.05$). This implies that antenatal booking may prevent preterm deliveries from occurring.

This study also found unbooked mothers were more likely to have C/S than booked mothers ($p < 0.02$). However, there was no significant difference between booked and unbooked mothers in terms of complications ($p < 0.50$). There were no referrals to level 2 or 3 hospitals, during the period of study.

5.5 PERINATAL PROFILE

There was no significant difference between booked and unbooked mothers in terms of birth weight (Mann Whitney's U test $p=0.88$). Although, the babies of unbooked mothers had a significantly lower Apgar score at 1 minute ($p=0.03$), the difference was not so significant for Apgar scores at 10 minutes ($p=0.06$). This coincides with the findings of this study, which demonstrated that there were more preterm deliveries among the unbooked mothers.

5.6 FINAL OUTCOME

Among the study population, there was no maternal mortality during this study period. All mothers were discharged home. There was no significant difference in perinatal mortality between the booked and unbooked mothers (Chi-square test, $p=0.29$).

CHAPTER 6

CONCLUSION 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 were 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 influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province.

6.1.1 PREVALENCE OF UNBOOKED MOTHERS WHO DELIVERED AT THE MATERNITY UNIT DURING THE STUDY PERIOD

The prevalence of unbooked mothers among the study population was 15.7% (n=93), which varied between 2.7% and 32.3% during the 12 month study period.

6.1.2 SOCIO-DEMOGRAPHIC AND CLINICAL PROFILE

The study found no significant differences in socio-demographic profile between booked and unbooked mothers except ethnicity. There were significantly more white women in the unbooked category. This study reported 13.2% teenage pregnancies among the study population, which is of concern. However, contrary popular belief, there was no significant association between booking status and teenage pregnancy.

The study found no significant differences in clinical profile between booked

and unbooked mothers except preterm labour and mode of delivery. Unbooked mothers were more likely to have a preterm baby and C/S deliveries. This implies antenatal booking can probably prevent preterm deliveries.

Although, the babies of unbooked mothers had a significantly lower Apgar score (1 min), the difference became insignificant at 10 min.

6.1.3 DETERMINATION OF THEIR OUTCOMES

There was no maternal mortality during this period. All mothers were discharged home. Perinatal mortality among the study population was 44/1000 birth. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

6.2 POSSIBLE LIMITATIONS OF THE STUDY

The limitations of the study were as follows:

1. There were missing information from 10 records in the electronic data base. This information was retrieved from the manual records.
2. This was cross-sectional study. A long term prospective study is necessary to understand the long term impact on the babies.
3. No primary data collection was done for this study.

6.3 RECOMMENDATIONS

The recommendations made below were based on the findings from this study as well as from the Maternity Unit staff. The analysis of the data also revealed some areas that need to be evaluated and recommendations were made based on the results of this study. Recommendations for further or more in depth research were also highlighted.

6.3.1 FOLLOW UP

Maternal health is currently a priority for the Limpopo Department of Health and Social Development. This study would hopefully assist the Province to develop an understanding of prevalence and impact of unbooked mothers on the maternal health services. Outcomes of the research will be presented to the district and provincial management of the Department of Health in Limpopo Province with the view of creating a model that can be used and rolled out to other hospitals with similar challenges in a rural setting.

6.3.2 FUTURE RESEARCH

The researcher would like to propose a long-term prospective study that would involve interviewing unbooked mothers to develop an understanding of the challenges faced by these women in that area.

6.4 SUMMARY AND CONCLUSIONS

This is the first study that looked at broad issues pertaining to the influence of booking status on pregnancy outcomes (maternal and neonatal) at a district hospital in a rural district in the Limpopo Province and probably in South Africa. The study found a prevalence of 15.7% (range: 2.7% and 32.3%) unbooked mothers among the study population during the 12 month study period. There were no significant differences in socio-demographic profiles except ethnicity. There were no significant differences in clinical profile except preterm delivery and mode of delivery. This implies antenatal booking can probably prevent preterm deliveries. There was no maternal mortality during this period. All mothers were discharged home. Perinatal mortality among the study population was 44/ 1000 birth. This study found a significant risk of perinatal morbidity (preterm delivery and low Apgar score) among the unbooked mothers.

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APPENDICES

**APPENDIX A: ETHICS CLEARANCE CERTIFICATE
AND LETTERS OF PERMISSION**

APPENDIX B: DATA COLLECTION SHEET