A SURVEY OF THE IMPLEMENTATION OF THE NATIONAL GUIDELINES FOR THE MANAGEMENT OF PREGNANCY INDUCED HYPERTENSION BY MIDWIVES AT LEVEL-1 CLINICS IN THE EASTERN CAPE

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Research report submitted to the Department of Nursing Education at the University of Witwatersrand in partial fulfilment of the requirements for the Degree of Master of Science

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DECLARATION

I, Nombuyiselo Susan Msimango declare that this research report is my own work. It is being submitted for the degree of Master of Science in Nursing in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signature: 

Date: 26 FEBRUARY 2009

DEDICATION

This book is dedicated to my loving husband, son, mother, family members and friends for their support and confidence shown in me. In loving memory of my late father, Maxwell Magengelele, grandmother, Noliqhwa Emily and uncle, Khehla Phillip Nkutha.

ABSTRACT

Pregnancy induced hypertension (PIH) occurring during pregnancy, labour and puerperium is a major contributor to the high percentage of maternal morbidity and mortality in the Eastern Cape Province, and worldwide.

In South Africa (SA), PIH is the second most common of all primary causes of maternal mortality reported in the triennium from 1999 to 2001. From 1999 to 2001, PIH was the cause of 20,7 % (n = 507) of all maternal mortalities in SA (Department of Health (DOH), 2001:38). In the light of these statistics and other statistics related to other causes of MMR, the National Confidential Committee on Enquiries into Maternal Deaths (NCCEMD) developed the *National Guidelines for Maternity Care in South Africa, a Manual for Clinics, Community Health Centres and District Hospitals*. The guidelines related to PIH were of particular interest in this study.

A quantitative, descriptive and contextual survey was conducted to determine the implementation of the *National Guidelines for Maternity Care* for the management of PIH by the midwife at level-1 clinics in the Eastern Cape, and to make recommendations for the management of PIH by midwives at level-1 clinics with the intention of reducing maternal mortality and morbidity due to PIH. The research method comprised a retrospective record review of the records of all patients admitted with PIH at a level-3 hospital who were referred by a midwife from a level-1 clinic. Data were collected by means of a researcher-administered data collection tool based on the

National Guidelines for Maternity Care in SA for the management of PIH. The researcher wished to determine whether the *National Guidelines for Maternity Care in SA* was being implemented for the management of PIH by midwives at level-1 clinics in East London. A purposive sample of 290 maternal records of mothers who had been admitted for PIH at level 3 after being referred from level-1 clinics from May 1999 to June 2003 were used. Data were analysed using descriptive statistics. Ethical issues were taken into consideration. Validity and reliability were ensured.

In conclusion, given the study findings, the researcher has made recommendations with the intention of reducing mortality due to PHI in the Eastern Cape.

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LIST OF ABBREVIATIONS

APH	-	Antepartum haemorrhage
BP	-	Blood Pressure
CTG	-	Cardiotocograph
DIC	-	Disseminated intravascular coagulation
DOH	-	Department of Health
EC	-	Eastern Cape
FBC	-	Full blood count
HELLP	-	Haemolysis elevated liver enzymes and low platelets
HIE	-	Hypoxic ischaemic encephalopathy
HMD	-	Hyaline membrane disease
ICU	-	Intensive care unit
IUFD/IUD	-	Intra-uterine foetal death
LDH	-	Lactic dehydrogenase
LFT	-	Liver function test
MAS	-	Meconium aspiration syndrome
$MgSO_4$	-	Magnesium sulphate
MMR	-	Maternal mortality ratio
MMMR	-	Maternal mortality and morbidity rate
MOU	-	Midwife obstetric unit
NCCEMD	-	National Committee on Confidential Enquiry into Maternal Deaths
NGO	-	Non-governmental organisation

NHP	-	National Health Plan
NHS	-	National Health System
PHC	-	Primary health care
PIH	-	Pregnancy induced hypertension
PPH	-	Postpartum haemorrhage
RDP	-	Reconstruction and Development Programme
RDS	-	Respiratory distress syndrome
SA	-	South Africa
SAMM	-	Severe acute maternal morbidity
SANC	-	South African Nursing Council
SB	-	Stillbirth
SGOT	-	Serum glutamic oxaloacetic transaminase
SGPT	-	Serum glutamic-pyruvic transaminase
TBA	-	Traditional birth attendant
VHW	-	Village health worker
UGH	-	Umtata General Hospital
UK	-	United Kingdom
WHO	-	World Health Organisation

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Pregnancy induced hypertension (PIH) is the second most common cause of maternal mortality and morbidity in South Africa (SA) (Department of Health (DOH), 1999:04). The report by the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) has revealed that the mortality rate due to PIH is particularly high in the Eastern Cape. Despite the high mortality rate in the Eastern Cape, no deaths due to PIH were reported in 1999, though, despite other evidence of mortality due to PIH. This may be due to underreporting of maternal deaths (DOH, 1999:14).

This chapter addresses the background to the problem and identifies the problem statement for the study. The research question is formulated and the research purpose explained; the objectives of the research are stated and the significance of the study explained. In addition, the assumptions of the researcher are explained so as to allow the readers an understanding of the meaning of the concepts used in the study. Lastly, an overview of the methodology followed for the study is provided.

1.2 BACKGROUND

Many changes took place in SA following the democratic elections in 1994. These changes brought about development of new policies and improvement of service delivery to the people. According to the National Health Plan of SA, the high maternal mortality rate, especially among the previously disadvantaged, was of great concern. The results of studies conducted in1989 revealed that maternal mortality rate was 8 per 100 000 for Whites and more than 58 per 100 000 for Africans (African National Congress (ANC), 1994:29). Emanating from the high maternal mortality among Africans, the Minister of Health appointed a National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD). The purpose of the NCCEMD is to reduce maternal mortality in SA (DOH, 1998:1). To enable the functioning of the NCCEMD, mortalities during pregnancy, labour and puerperium were made notifiable events in October 1997, in terms of the National Policy Act Number 116 of 1990.

The National Health Plan (NHP) was developed together with the Reconstruction and Development Programme (RDP). These documents looked at creating one single comprehensive, integrated and equitable National Health System (NHS). The National Health System represents a single governmental structure dealing with health based on national guidelines, standards and priorities accountable to South Africans (ANC, 1994: 19). Amongst the national priorities identified are *maternal and child care*, protection of the environment, women's health and care for the disabled, to mention just a few. In the

NHP the government follows the new Primary Health Care (PHC) approach to deliver health services. PHC is viewed as central to the provision of comprehensive health care and was defined in the Alma Ata Declaration as "the essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination" (ANC,1994:20). PHC forms an integral part of the country's NHS as a central focus, while PHC guides the overall social and economic development of the community. PHC is viewed as the best possible form of health care for the rich and poor in any society (ANC, 1994:21). Primary health care is a concept that is changing the medical culture and puts emphasis on community participation, empowerment and inter-sectoral collaboration. Rural communities in the EC benefit from the PHC services as there are few hospitals in the region and the province is mainly rural. PHC services are rendered by midwives and professional nurses with varied expertise. Doctors do visit the PHC facility at certain intervals and deal with cases that are beyond the scope of practice of the midwife.

Women who are pregnant, in labour or have delivered utilise these PHC services. The utilization of these services requires that midwives should keep abreast with knowledge and changes taking place in the health system, to enable them to promote, prevent, cure and rehabilitate these women if there are complications. At present, PHC services are

open from 07:00 to 16:00 in the Eastern Cape and, in the absence of midwives, pregnant women are cared for by traditional birth attendants (TBAs) and village health workers (VHW). TBAs and VHWs know how to care for these women and what to do should complications arise. Village Health Workers (VHW) are also trained by non-governmental organisations (NGOs) to care for women during pregnancy, labour and puerperium.

One of the challenges facing midwives at PHC clinics is the death of women during pregnancy, labour and puerperium, and one of the significant contributors towards maternal death is pregnancy-induced hypertension. 'Managing pre-eclampsia remains a challenge for physicians and health care services' (Perez-Cuevas et al, 2003:6). Between 1999 and 2001, PIH was responsible for approximately 1 in 3 (34,6 %) of maternal deaths in SA (DOH, 1999:5).

In the Eastern Cape, the maternal mortality rate was 5,08 per 100 000 births in1999; 6,42 per 100 000 births in 2000 and 5,51 per 100 000 births in 2001. Given that the MMR is high in the Eastern Cape one of the purposes of the NCCEMD is to make recommendations based on the confidential study of maternal deaths. These recommendations help in the development of policy guidelines that are implemented so as to reduce maternal mortality and morbidity as a result of PIH (DOH, 1998:01).

According to the 1998 NCCEMD report, one of the factors contributing to the high incidence of maternal mortality due to PIH is failure to correctly diagnose and manage PIH at the initial assessment at level 1 (DOH, 1998). Evidence provided by the DOH

(1998) is as follows:

"Action taken by the midwife on receiving a patient with clinical features suggestive of PIH was inappropriate, as identification of the problem at initial assessment was poorly done, and standard protocols were not followed in 22 cases at all levels" (DOH, 1998:07).

"Observations of a patient presenting with clinical features suggestive of PIH were done infrequently or incompletely or prolonged abnormal observations were recorded without action being taken" (Pattison et al., 2000:367).

In addition, the following problems / missed opportunities were identified by the NCCEMD with respect to the midwifery management of PIH (Pattison *et al*., 2000:71; DOH, 1998:5):

- Misdiagnosed cases of PIH and delays in referring patients with clinical features suggestive of PIH;
- Delays in transporting patients with clinical features suggestive of PIH from level 1 to either level 2 or 3;
- Failure to implement standard protocols for the management of PIH such as the administration of magnesium sulphate to control the blood pressure in PIH as an emergency and maintenance treatment;
- Not attending patients who requested assistance from the nurses; not assessing

patients daily or not carrying out prescriptions;

- Lack of availability of blood transfusion and lack of intensive care unit (ICU) beds, equipment and trained midwives and patients not attending antenatal clinic or patients who delay in seeking help.

1.3 PROBLEM STATEMENT

Pregnancy-induced hypertension is rated as the second most important cause of maternal mortality in South Africa. This raises concern as PIH can be diagnosed and managed before serious complications arise (DOH, 2000:38). According to the report of the NCCEMD 2002, there was a marked increase in the notification of maternal mortalities as compared to 1998, but the EC and some other provinces, like Limpopo, were noted as under reporting the number of maternal mortalities. The under reporting could be attributed to the number of home deliveries, which constituted 25 % of deliveries in the EC (DOH,1999:2).

Based on the findings of the NCCEMD, Guidelines for Maternal Care in SA, a Manual for Clinics, Health Care Centres and District Hospitals was developed. The National Guidelines for Maternity Care for the management of PIH provides for the management of different conditions that occur as a result of pregnancy, labour or puerperium.

The *National Guidelines for Maternity Care* for the management of PIH provides recommendations such as that all women with PIH should be admitted to hospital and managed ccording to the severity of the disease (DOH, 2002:75). Despite the development and implementation of the *National Guidelines for Maternity Care* for the management of *PIH*, PIH remains one of the leading causes of maternal mortality in SA. In SA, this increase in MMR is not due to lack of knowledge, but due to the fact that the available knowledge is not implemented (DOH, 1998:02).

The researcher was interested in looking at the independent functions of the registered midwife with respect to the implementation of the *National Guidelines for Maternity Care* for the management of PIH at level 1, by asking the questions that follow.

1.4 RESEARCH QUESTION

The study sought to elucidate the following issues pertaining to the independent functions of the registered midwife with respect to PIH at level 1:

Are the *National Guidelines for Maternity Care* for the management of PIH (DOH, 2000) being implemented by midwives at level 1 to reduce maternal morbidity and mortality due to PIH?

What can be done to reduce the maternal morbidity and mortality due to PIH in the EC?

1.5 RESEARCH PURPOSE

The purpose of the study was to determine the extent of the implementation of *National Guidelines for Maternity Care* for the management of PIH by the midwife at level 1 with the intention of making recommendations for the midwifery management of PIH at level 1 to reduce maternal mortality and morbidity due to PIH.

1.6 RESEARCH OBJECTIVES

The purpose of the study was achieved through the following objectives:

- To describe the implementation of *National Guidelines for Maternity Care* for the management of PIH by midwives.
- To make recommendations for the midwifery management of PIH at level 1.

1.7 SIGNIFICANCE OF THE STUDY

The fact that South African women continue to die at this important moment of their lives, prompted the justification of the study. Countless women in South Africa are admitted to hospital for treatment of pregnancy-induced hypertension and treatment of complications related to pregnancy-induced hypertension. Many of these women and / or their foetuses or neonates die of complications related to pregnancy-induced hypertension (DOH, 2000:6). The researcher has also noted that PIH continues to contribute significantly to the maternal mortality in SA, despite the fact that there are national guidelines that have been developed to be implemented at all levels of care by midwives (DOH, 2000:7).

Information obtained from the study will be fed back to the policy makers, nurse educators and practising midwives in the form of recommendations with a view to improving the outcome of maternal service to patients with PIH at level 1.

1.8 RESEARCHER'S ASSUMPTIONS

The researcher describes meta-theoretical, theoretical and methodological assumptions in order to provide the conceptual framework for this study. Assumptions are "basic principles that are accepted on faith, or assumed to be true without being verified or proved" (Polit & Hungler, 1995:10). These are statements that are taken for granted or considered true, even though they have not been scientifically tested. Sources of assumptions include universally accepted truths. Assumptions have an influence in the

implementation of the research process (Burns & Grove, 2001:46).

1.8.1 Meta-theoretical assumptions

Introduction

The researcher includes the meta-theoretical assumptions about the midwife, health, patient and environment.

Midwife

A midwife is a person who, having been admitted to a midwifery educational programme recognised in the country in which he / she is located, has completed the prescribed course of midwifery studies successfully, and has acquired the requisite qualifications to enable registration and / or be legally licensed to practise midwifery. The midwife must be able to give the necessary supervision, care and advice to women during pregnancy, labour and the period of puerperium, to conduct deliveries on her own and to care for the newborn and the infant. The care includes preventive measures, detection of abnormal conditions in the mother and child, procurement of medical help and the execution of emergency measures in the absence of medical help. She has to provide counselling where needed and education of the women and also within the family and the community. She may practise in clinics, hospitals, domiciliary conditions, health units or in any other

service (Fraser & Cooper, 2003:5).

The midwife is recognised as a practitioner in her own right and as responsible and accountable for her own acts and omissions in South Africa. In terms of the South African Nursing Act, No. 50 of 1978, as amended, a midwife must be registered with the South African Nursing Council (SANC) to practise midwifery (De Kock & Van der Walt, 2004:1-4).

Health

Health in this study has to do with a pregnant, labouring and delivered woman for the first 42 days after delivery, who shows neither signs of PIH nor risk factors for PIH. A healthy woman is physically, socially, spiritually and mentally sound and does not suffer from any disease or infirmity.

Patient

In this study, a patient is a pregnant woman who experiences increased blood pressure, that is, a systolic blood pressure of 140 mmhg and above, and a diastolic blood pressure of 90 mmhg and above, recorded on at least two occasions, four to six hours apart. The woman has oedema of the lower extremities and/or the whole body; the presence of

protein in urine, that is, there must be a reading of 1+ or more, using a dipstick. In severe cases the woman could experience eclampsia. Such a patient received midwifery Care at level 1 and was referred by the midwife or by self-referral to a level-3 health centre for further management to prevent maternal mortality or morbidity from PIH.

Environment

The environment is a level-1 health care facility that the pregnant woman attended to receive antenatal care until she delivered. The relationship between the midwife and the patient should be that of mutual trust and understanding. In this relationship the patient should feel free to inform the midwife of any issues affecting her health or the foetus.

1.8.2 Theoretical assumptions

Theoretical assumptions assign meaning to a variable or a definition and describe the activities that are required in order to measure it. The definition should be specific to the extent that other researchers can replicate the study and construct the measurement in the same way, based on the definitions (Brink, 1996:95). Operational definitions are discussed under theoretical assumptions.

1.8.2.1 Operational definitions

Midwife

The midwife in this research is registered with the South African Nursing Council on completion of the training period, has met all the necessary requirements for midwifery studies and has passed the examinations, practises midwifery legally in SA and is working at a level-1 clinic. She provides midwifery care to pregnant women with PIH and implements the *National Guidelines for maternal care, a manual for clinics, health centres and district hospitals* for the management of PIH, at level 1. She is a person who functions according to the regulations and rules of the SANC and the Nursing Act, No. 50 of 1978, as amended.

Substandard care

The use of the above term, according to the NCCEMD, does not only fail in clinical care, but also some underlying factors which may have contributed to low standard care for the patient. This includes actions taken by the patient herself or relatives, which may be outside the control of the clinicians. Clinician, in this study, refers to the midwife. It also considers shortage of staff, administrative failure in the services and back-up facilities like laboratory services, radiology and anaesthetics (DOH, 1999:258).

Level-1 hospital

This refers to a district hospital or a community health centre situated in the community and providing facilities for general practitioners and midwives. It will be regularly visited by specialists from provincial hospitals. Certain specialist services may also be rendered.

Level-2 hospital

The level-2 hospital is a base hospital for a region and serves a number of districts. Should a complication arise at level 1, the patient may be referred to level 2.

Level-3 hospital

Level-3 hospitals are central or tertiary hospitals, a facilities with specialised equipment for management of very ill or difficult obstetric patients (DOH, 2000:14).

Antepartum haemorrhage

According to Fraser and Cooper (2003:297) and (Nolte, 1998:277), antepartum haemorrhage is defined as bleeding from the genital tract in a viable pregnancy after the 24^{th} or 28^{th} week of pregnancy and before the onset of labour.

Intra-uterine death

Intra-uterine death refers to the disappearance of foetal life during pregnancy (Nolte, 1998:370).

Labour

Labour is the process by which a viable foetus, placenta and membranes are expelled from the uterus through into the pelvic or birth canal and through the vaginal orifice (Fraser & Cooper, 2003:346).

Postpartum haemorrhage

Postpartum haemorrhage is excessive bleeding from the genital tract at any time following the birth of the baby up to six weeks after delivery. Postpartum haemorrhage is divided into primary and secondary haemorrhage, depending on the time of bleeding after delivery (Fraser & Cooper, 2003:521).

Conception

This is the term signifying the fusion of the ovum and spermatozoon which starts the beginning of a new life (De Kock & Van der Walt, 2004:6-2)

Pregnancy-induced hypertension

Pregnancy-induced hypertension refers to hypertension developing during pregnancy. Hypertension is present if the systolic pressure increases by 30 mmhg and the diastolic pressure increases by 15 mmhg or BP > $^{140}/_{90}$ mmhg. The elevated BP reading should be present on two occasions, six hours apart. In the event of PIH, the increased blood pressure will develop after 20 weeks and may be accompanied by proteinuria (Nolte, 1998:290).

Puerperium

Puerperium is the period of time extending from the end of the third stage of labour to the end of the sixth week following delivery (Sellers, 1993:1791). Fraser & Cooper (2003:626) define the puerperium as the period starting immediately after delivery of the placenta and membranes and continuing for six weeks.

Maternal mortality rate

Maternal mortality rate refers to death of a woman as a result of pregnancy and labour and includes the first six weeks or 42 days of the puerperium, expressed per 100 000 childbirths per time unit (Nolte, 1998:515; De Swiet, 2000:760). According to Cronje and

Grobler (2007:708), maternal morality rate, where rate is replaced by ratio, is defined as the number of women dying in an area from the conception to six weeks after birth per total number of live birth for that area, over a defined period expressed per 100 000 live births.

Proteinuria

Proteinuria is an excessive amount of protein in the urine. Normally, urine does not contain protein, but a trace of protein in urine is not regarded as abnormal. Proteinuria during pregnancy is diagnosed when either of the following is present:

0.3g or more of protein in a 24-hour urine specimen; or
1+ or more protein as measured with a reagent strip (Theron et al, 2006:3-3).

1.8.3 Methodological assumptions

The scientific approach is a method of acquiring knowledge that is generally more reliable than tradition (Polit & Hungler, 1995:9). According to Burns and Grove (2001:10), science comprises a coherent body of knowledge which is composed of research findings and tested theories for a specific discipline. It is both a process and a product. It is the accepted process for obtaining knowledge within a specific field (Burns & Grove, 2001:10).

This research is presented as scientific as it concerns a quantitative study in which the research process was applied. The basis for the study was the 1999 to 2001 triennial report of the NCCEMD, in which the prevalence of PIH in the Eastern Cape was reported and the experience of the researcher at a tertiary health care facility for women referred from level 1 due to PIH. Furthermore, the scientific approach has been applied. The researcher developed a research question, aims and objectives. Then the researcher developed a research design and method that would best answer the research questions. Data were analysed by means of descriptive statistics.

1.9 OVERVIEW OF THE METHODOLOGY

1.9.1 Research design

A brief overview of the research methodology is provided. The reader may refer to Chapter 3 for a detailed description. The aim of the study was achieved through a quantitative, descriptive and contextual design. According to De Vos (1998:71), quantitative research is formalised and explicitly controlled. The data-collecting tool was constructed by the researcher. The researcher collected information step by step regarding implementation of *National Guidelines for Maternity Care for* the management of PIH by midwives at level-1 hospitals, prior to referral to level-2 and level-3 hospitals.

A descriptive design was used to describe the implementation of *National Guidelines for Maternity Care* for the management of PIH by midwives at level 1. A descriptive study is a non-experimental study in which the purpose is to observe, describe and document aspects of the situation (Polit *et al*., 2001:180).

A contextual study is a study that seeks to avoid separation of the components from the larger context to which the elements may be related (De Vos, 1998:281). The researcher focused the study on the midwives in the Amatole district in the Eastern Cape, in the context of maternity care. Maternal health services are provided in urban, rural, peri-urban and informal settlement areas in this district. The maternal care services are run by midwives who function according to their scope of practice. Some of the health care facilities do not provide midwifery care; as a result obstetric patients are referred to other centres that do provide midwifery services. Patients are referred to levels 2 and 3 respectively for further management, should they present with serious complications, such as PIH. Referrals to level 3 are also received from other districts.

1.9.2 Research method

This was a retrospective study of patients who were referred by a midwife from level-1 facilities to a level-3 health facility, for the management of PIH. A retrospective study is a study in which the researcher examines some phenomenon existing in the present that is

linked to other phenomena occurring in the past. Data were collected from the patients' records, thus the study comprised a retrospective review of records. A checklist was used for each record; this was administered by the researcher. The checklist was a data collection tool designed according to the *National Guidelines for Maternity Care* for the management of PIH.

Population is the term for setting boundaries on study units. It also refers to individuals in the universe who possess specific characteristics determined by the research (De Vos, 2001:190). The population consisted of women with PIH referred from level 1 and admitted to a level-3 health facility, between May 1999 and June 2003. The population was identified from the statistical records of the Frere hospital maternity birth register for the period under study.

Sampling and sample selection was done by accessing the records of all women who received antenatal care from a midwife at a level-1 health care facility and had an antenatal card. The records were accessed according to the filing system of the clerks. The criteria for inclusion in and exclusion from the population were set as follows:

The following criteria were applied for inclusion:

All patients admitted with PIH referred from level 1 to level 3 and were managed by the midwife at level 1.

Records of patients that were complete, that is, included an antenatal card, midwives' and doctor's records from level 1 and level 3.

The following details had to appear on the antenatal clinic card:

- Personal details;
- Obstetrical history, both past and present;
- Social history;
- Gynaecological history;
- Surgical history;
- Past and present medical and any medical examination done;
- All the investigations that were carried out;
- Prophylactic treatment and treatment given;
- Observations done at each visit;
- Plot of the foetal growth and maternal condition.

Some records did not have the antenatal cards but the required information was recorded on the maternity case sheet or referral letter; such files were included in the study as the patient's notes were complete.

The following exclusion criteria applied:

Patients admitted to level 3 without having been seen by the midwife at level 1;
Patients who did not attend antenatal care at a level-1 facility; and
Patients who were unbooked.

Purposive sampling was applied. A total of 550 records were retrieved initially. After looking at the inclusion criteria 290 records fitted the criteria. Some patients included in the study did not have antenatal cards, but adequate history of level-1 care was recorded in their notes.

Data collection refers to the precise systemic gathering of information relevant to the research purpose or the specific objectives, questions or hypothesis of a study (Burns et al., 2001:794). Data pertaining to the midwifery implementation of the *National Guidelines for Maternity Care* for the management of PIH at level 1 were collected. Data were collected by means of a checklist, please refer to annexure C designed according to the objectives and purpose of the study.

Collected data were analysed with the purpose of drawing conclusions and reflecting the ideas, interests and theories that led to the inquiry (Babbie, 1995:104), please refer to chapter 3 for detailed description. Analysis of data was done with the help of a

statistician. Descriptive statistics were used. Validity refers to the degree to which an instrument measures what it is supposed to be measuring (Polit et al., 2001:308) and content validity concerns how well the instrument represents all the different components of the variable to be measured (Brink, 1996:168).

The instrument that was used was developed from the following documents, please refer to annexure G:

National Guidelines for Maternity Care for the management of PIH;
The Maternal Death Assessor Control form developed by NCCEMD;
The Saving Mothers report on Confidential Enquiries into Maternal Deaths in South Africa 1998 and the 1999-2001 executive summaries;
Essential Drug List (EDL); and
R2488- Regulations relating to the conditions under which registered midwives and enrolled midwives may carry on their profession and R2598- Regulations relating to the scope of practice of persons who are registered or enrolled under the Nursing Act, 1978 from the South African Nursing Council (SANC).

Steps were taken to ensure reliability. Inter-rater reliability was not a concern as the researcher administered the instrument without assistance.

A pilot study is a trial run of the major study and is conducted with the purpose of obtaining information to improve the data collection and determine the feasibility of the study (Polit et al.,1995: 34). The pilot study to determine applicability was conducted on the records of 10 patients collected from a level-3 hospital. The data obtained from the pilot study was not included as changes were made to the data collection tool.

1.10 ETHICAL CONSIDERATIONS

An overview of the ethical considerations is provided in this chapter (Chapter 1), while a detailed discussion on ethical considerations is presented in Chapter 3. The patients whose records that were used were not identified by name but by number. The rights of patients were preserved by maintaining confidentiality while working with the records. Nobody besides the researcher had access to patients' records: Data were collected by the researcher in a separate room to ensure privacy and this room was locked whenever the researcher had to go out. The researcher obtained consent to conduct the study from the Ethical Committee of the East London Hospital Complex; the ethical committee of the University of Witwatersrand; the postgraduate committee of the Faculty of Health Sciences of the University of Witwatersrand and the person in charge of the hospital (Frere). A final report will be written and sent to the relevant units after the research to ensure dissemination of the research findings.

1.11 STRUCTURE OF RESEARCH REPORT

Chapter 1	-	Overview of the study
Chapter 2	-	Literature review
Chapter 3	-	Methodology
Chapter 4	-	Data analysis and results
Chapter 5	-	Conclusion, recommendations and limitations

1. 12 CONCLUSION

Chapter 1 has provided an overview of the study and the background to the study. The problem statement was defined, as well as the researcher's assumptions. Operational definitions have been explained and a brief overview of the methodology given. The different types of hypertension during pregnancy, risk factors of PIH, the pathophysiology of PIH and the midwifery intervention according to the *National Guidelines for Maternity Care* for the management of PIH will be explained in detail in the following chapter.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

An overview of studies that have been conducted on pregnancy induced hypertension (PIH) in South Africa and internationally is provided in this chapter. Risk factors or predisposing causes of PIH and how the organs of the body are affected by hypertension in pregnancy are also explored. Factors to be taken into consideration by the midwife during history taking and observations to be made in order to diagnose PIH at level 1 are discussed and the medical and nursing management during the antenatal and postpartum periods of the patient with PIH is explained. The sources used for the development of the data collection tool will be described in detail.

The sources used for the development of the data collection tool included:

National Guidelines for Maternity Care for the management of PIH;
Saving Mothers report on confidential enquiries into maternal deaths in South Africa 1999-2001executive summary;
Essential drug list (EDL);
South African Nursing Council regulations R2488 and R2598; and

Maternal death assessor control form (NCCEMD form).

2.2 DEFINITION OF PREGNANCY INDUCED HYPERTENSION

Pregnancy-induced hypertension (PIH) is defined as hypertension and proteinuria developing when the pregnancy reaches more than twenty weeks, during labour, or during the puerperium in a previously normotensive woman. According to Panday, Mantel and Moodley (2004:387), hypertension was defined as a blood pressure of more than 140/90 mmHg taken on two occasions of 4 hours apart, and appearing for the first time in pregnancy. Increased blood pressure in pregnancy is divided into six categories.

2.2.1 Categories of hypertension

There are six categories of hypertension; these are as follows (Woods, Theron & Greenfield, 2006: 3):

- Chronic hypertension;
- Gestational hypertension;
- Pre-eclampsia;
- Eclampsia;
- Chronic hypertension with superimposed pre-eclampsia; and
- Unclassified hypertension and unclassified proteinuric hypertension.

Each category of hypertension will be discussed in detail.

2.2.1.1 Chronic hypertension

Chronic hypertension is defined as hypertension before pregnancy or an increase in blood pressure of $^{140}/_{90}$ mmHg before the gestational age of 20 weeks, persisting up to 6 weeks (42 days) after delivery (Fraser & Cooper, 2003:358). Nolte's (1998:290) definition concurs with this, but further identifies the causes of chronic hypertension as follows:

- Essential or primary hypertension;
- Secondary hypertension;
- Renal causes, e.g. Nephritis; and
- Endocrinal causes, e.g. Cushing's syndrome.

2.2.1.2 Gestational hypertension

Gestational hypertension is diagnosed when the woman's blood pressure rises above $^{140}/_{90}$ mmHg after resting, on at least two occasions no more than one week apart after the 20th week of pregnancy if the woman is known to be normotensive. The development of hypertension is without signs of pre-eclampsia. Hypertension that is diagnosed for the first time during pregnancy and does not resolve after delivery is also classified as gestational hypertension (Fraser & Cooper, 2003:358).

2.2.1.3 Pre-eclampsia

Pre-eclampsia involves the development of hypertension and proteinuria after 20 weeks of pregnancy. Proteinuria is indicated by presence of protein in urine that is greater than 1+ on a dipstick, or more than 0.3g/L in a random clean specimen of urine in 24 hours (Fraser & Cooper, 2003:358; Nolte, 1998:289). Pre-eclampsia is usually associated with trophoblastic diseases of the placenta. In the absence of proteinuria, pre-eclampsia is suspected when hypertension is accompanied by other symptoms, like headache, abdominal or epigastric pain, blurred vision, or altered biochemistry. According to Seonae and Davidge (2001:983) pre-eclampsia is diagnosed by the onset of proteinuria and hypertension in the latter half of pregnancy.

2.2.1.4 Eclampsia

Eclampsia is indicated by the onset of convulsions during pregnancy or up to 42 days after delivery not caused by other pathological conditions, in a woman with pre-eclampsia. The condition increases the chances of maternal, foetal and neonatal mortality (Fraser & Cooper, 2003:358; Nolte, 1998:290). Eclampsia is defined by Beischer, Mackay and Colditz (1997:214) as grand mal seizures occurring as a result of pregnancy-related hypoxia. It is a serious complication because of the high risk to the life of both the mother and the foetus.

2.2.1.5 Chronic hypertension with superimposed pre-eclampsia

Pre-eclampsia superimposed on chronic hypertension is a condition whereby the blood pressure of the pregnant woman is found to be increased by 30 mmHg systolic and 15 mmHg diastolic pressure in a known hypertensive patient, together with the presence of proteinuria or generalised oedema (Nolte, 1998: 290; Fraser & Cooper, 2003:358).

2.2.1.6 Unclassified hypertension and unclassified proteinuric hypertension

Unclassified hypertension and unclassified proteinuric hypertension is diagnosed with reference to a patient seen for the first time in the second trimester of pregnancy with hypertension and / or proteinuria (Theron *et al*., 2006: 3-5).

2.3 GRADING OF HYPERTENSION IN PREGNANCY

Hypertension is revealed through a blood pressure of $^{140}/_{90}$ mmHg or higher on two occasions about six hours apart (DOH, 1998:76). Pregnancy-induced hypertension is graded as follows (DOH, 1998:76):

Grade	Blood pressure	Proteinuria	Oedema
Mild	$^{140}/_{90}$ mmHg or above	Nil	+
Moderate	$^{150}/_{100}$ mmHg or above	+	++
Severe	$^{160}/_{110}$ mmHg or above	++	+++

2.4 INCIDENCE OF HYPERTENSION IN PREGNANCY

Pregnancy-induced hypertension causes complications in 5 to 8 % of all pregnancies in South Africa. Pregnancy-induced hypertension complicates 12 % of primigravidae pregnancies (Sellers, 1993:1163).

In South Africa, 5 to 10 % of pregnancies were complicated by PIH between 1999 and 2001 (DOH, 2002:73). According to a study conducted by Buga (1996:22) at the Umtata general hospital (UGH) between 1993 and 1994, 42.9 % of pregnancies in primigravidae were complicated with PIH. Of these, 4.6 % of patients developed complications of hypertension in pregnancy.

In another study, conducted by Mateyise (1996:73), at the Umtata general hospital, PIH was identified as the cause of 76,7 % (n = 270) of antenatal pregnancy-related complications, and 39.4 % of the 76.7 % of patients developing hypertension also developed eclampsia.

2.5 PRECIPITATING FACTORS AND RISK FACTORS

Pregnancy-induced hypertension is common in patients who have had PIH / and pre-eclampsia during previous pregnancies, although the severity of the condition decreases with subsequent pregnancies. A midwife should be able to identify the risk factors which could lead to the development of PIH. Any woman presenting with these factors should be seen in the antenatal clinic more often, so as to identify any deviation in blood pressure from normal at an early stage, in order to intervene immediately. Pregnancy-induced hypertension is a worldwide problem (Sellers, 1993:1163; DOH, 2002:74; Nolte, 1998 :291; Beischer *et al*., 1996:209). The risk factors for PIH are identified as follows:

Primigravida - Epidemiological studies suggest that there is abnormal placentation caused by genetically predetermined maternal immune response to antigens of the foetus derived from the father and expressed in normal foetal tissue. The prevalence

decreases after long-term exposure to the paternal sperm (Fraser *et al*., 2006:338).

Multigravida - The risk is as has been described for primigravida but, in the case of multigravida, the risk will increase again if the partner is changed.

Previous pregnancy complicated by PIH or such a history in the family – A past history of a pregnancy complicated by pre-eclampsia that developed during the late second or early third trimesters are at risk of developing pre-eclampsia again (Theron, Wood, Greenfield, Louw & De Groot, 2006:3-19).

Maternal diseases like hypertension, cardiac, diabetic mellitus or thrombophilia – The category falls under conditions associated with micro vascular diseases leading to abnormal placentation and reduced placental perfusion (Fraser, Cooper & Nolte, 2006:339). Insufficient placental perfusion leads to increased production of thromboxane, which increases aggregation of platelets causing vasoconstriction (De Kock & Van der Walt, 2004:20-4).

Socio-economic status – Poverty will prevent a woman from making regular visits to the clinic for antenatal care (Fraser, Cooper & Nolte, 2006:340).

Multiple pregnancy – Due to a large placental mass, there is inhibition of invasion of the spiral arteries. This results in decreased placental perfusion, which leads to hypoxia of the placenta. Hypoxia leads to the release of thromboxane, which causes platelet aggregation. The effect of the aggregation of platelets is vasospasm and increased blood pressure (Fraser, Cooper & Nolte, 2006:339).

Hydatidiform mole (trophoblastic disease) – the trophoblast invades the spiral arterioles in the wall of the uterus. The invasion leads to formation of funnel-shaped vessels that are unresponsive to vasoconstriction. The placenta becomes insufficiently perfused and thromboxane production is increased. Thromboxane leads to platelet aggregation and causes vasoconstriction, thus hypertension (De Kock & Van der Walt, 2004:20-4).

2.6 PATHOPHYSIOLOGY

The pathophysiology of hypertension in pregnancy will be discussed in more detail under the following headings:

- Decreased trophoblast infiltration of spiral arterial walls in early pregnancy;
- Vascular damage with increased endothelial permeability;
- Thrombocytopenia;
- Glomerular endotheliosis;
- An increased sensitivity to vasopressors;
- Arteriolar spasm with decreased intravascular blood volume; and
- Prostacyclin-thromboxane balance.

2.6.1 Decreased trophoblast infiltration of spiral arterial walls in early pregnancy

Trophoblastic invasion of the spiral arteries of the myometrium and decidua causes the arteries to widen, allowing more blood to flow to the intervillous spaces. The process starts before the eighth week of pregnancy. In pre-eclampsia, the same process occurs to a lesser degree (if it occurs at all), resulting in narrowing of the blood vessels. Narrowing of the blood vessels leads to placental insufficiency and poor foetal growth (Cronje & Grobler, 2007:499). According to De Kock and Van der Walt (2004:20-4) and Fraser, Cooper and Nolte (2006:338), placental insufficiency results in the production of thromboxane, which increases the aggregation of platelets and causes vasoconstriction. Vasoconstriction eventually leads to hypertension.

2.6.2 Vascular damage with increased endothelial permeability

A capillary leak leads to oedema, fibrin and sub-endothelial platelet deposition, haemorrhage and necrosis of vital organs like the brain and liver. The maternal immune, vascular integrity maintenance and anticoagulant effects are all complex actions modulated by normal vascular endothelial cells. The damaged endothelium loses normal functioning and produces pro-coagulant, vasoconstriction substances and mitogens (an agent that triggers mitosis) (Cronje & Grobler, 2007:499). The increased permeability of

the capillaries can result in oedema, protein in the urine and decreased plasma volume (De Kock & Van der Walt, 2004:20-4). The endothelial cells regulate the capillary transport, control plasma lipid contact and modulate vascular smooth muscle reactivity to different stimuli (Fraser, Cooper & Nolte, 2006:339).

2.6.3 Thrombocytopenia

Injury to the endothelium results in increased activation of platelets, platelet consumption in the microvasculature and excessive clotting activity. As a result, platelet count decreases, damage to erythrocyte increases and abnormal platelet function results (Cronje & Grobler, 2007:499). Increased consumption of platelets leads to thrombocytopenia and may be responsible for disseminated intravascular coagulation (DIC). Progression of the disease could lead to fibrin and platelets occluding blood flow to the placenta, brain, kidneys and liver (Fraser, Cooper & Nolte, 2006:339).

2.6.4 Glomerular endotheliosis

A glomerular lesion in the kidney is characterised by glomerular endothelial oedema with underlying fibrinoid deposits. Flow of blood to the kidney and the filtration rate of the glomerulus are reduced. Permeability for proteins is increased, resulting in proteinuria and oliguria (Cronje & Grobler, 2007:499). Renal damage results in reduced creatinine

clearance leading to increased creatinine and uric acid levels (Fraser, Cooper & Nolte, 2006:339).

2.6.5 An increased sensitivity to vasopressors

The transfer of sodium from the extra cellular space to the intracellular space, especially in artery walls, is increased, leading to an increased sensitivity to vasopressors. Though there is a twofold increase in the activity of renin-angiotensin II, bold pressure in normal pregnancy does not rise due to reduced sensitivity to angiotensin II. In pre-eclampsia, there is an increase in sensitivity to angiotensin II (Cronje & Grobler, 2007:500; De Kock & Van der Walt, 2004:339).

2.6.6 Arteriolar spasm with decreased intravascular blood volume

Plasma colloid pressure is reduced due to leakage of plasma proteins resulting from damaged blood vessels. Leakage of plasma proteins leads to an increase in oedema within the intracellular space, lungs become congested and pulmonary oedema develops, leading to cyanosis as a result of poor oxygenation. Hepatic vascular bed blood vessels constrict, leading to oedema and hypoxia of liver cells. Oedema of the liver causes epigastric pain and can lead to intracapsular haemorrhages or rupture of the liver. A rise in liver enzymes and a fall in serum albumin indicate altered liver function. Haemoconcentration and hypovolaemia result from reduced intravascular plasma volume, leading to elevated

haematocrit. The combination of dysfunction of the cerebrovascular endothelium and hypertension causes the permeability of the blood-brain barrier to increase, resulting in oedema of the cerebrum. Cerebral oedema is indicated by severe headaches, convulsions and blurred vision. Formation of blood clots, cerebral oedema and cerebral vasospasm result from the disrupted auto regulation of the cerebral flow (Fraser, Cooper & Nolte, 2006:339). According to Cronje and Grobler (2007:500), increased cardiac output, systemic vascular resistance, hypertension and haemoconcentration lead to arteriolar spasm seen in the fundus of the eye and nail bed as segmental spasm.

2.6.7 Prostacyclin-thromboxane balance

Prostaglandins are synthesised in the utero placental area. In a normal pregnancy, prostacyclin is predominant, has a vasodilatory effect and opposes platelet aggregation in spiral arteries. In pre-eclampsia, thromboxane is dominant and this results in vasoconstriction and aggregation of platelets (Cronje & Grobler, 2007:501). The definite cause of pre-eclampsia is not known; the condition occurs in human pregnancy and resolves afterbirth. The placenta is considered to be the primary pathology and the foetus is involved to a certain extent. The disease process results in generalised vasoconstriction and multi-organ involvement, for example, the central nervous, cardiovascular, hepatic and coagulation systems are at risk (De Kock & Van der Walt, 2004:20-4).

2.7 DIAGNOSIS

A full history and assessment of a pregnant woman on admission is vital in order to make the correct diagnosis of PIH. The diagnosis of PIH requires the presence of proteinuria and raised blood pressure, more especially if the pregnancy has reached 20 weeks or more , or is accompanied by an increase in mass of more than 0.5 kg per week between 20 and 30 weeks, or involves a sudden increase in mass of greater or equal to 1 kg per week (Cronje & Grobler, 2006:499). After assessment, implementation of the correct midwifery management of PIH is done to prevent complications from occurring. The following assessment should be conducted by the midwife at level 1 (Fraser & Cooper, 2003: 365; DOH, 2002:7).

- Severity of the oedema of the lower extremities and/or whole body;
- Accurate measurement of the blood pressure;
- Assessment of the presence of vaginal bleeding;
- Pallor and jaundice;
- Uterine tenderness and irritability;
- Liquor volume and foetal size;
- Assessment of the cervix for ripeness;
- Urinalysis for the presence of protein; and
- Assessment of the condition of the foetus using the foetal scope or non-stress test.

The midwife should ask about the presence of the following symptoms of imminent eclampsia during history taking (Fraser & Cooper, 2003:365; DOH, 2002:7):

- Nausea and vomiting;
- Drowsiness or confusion due to cerebral oedema;
- Visual disturbances, that is, flashing lights or blurring of vision due to retinal oedema;
- Epigastric pain denoting liver oedema and impairment of the liver;
- Persistent frontal headache due to cerebrovascular endothelial dysfunction;
- Increase in proteinuria due to glomerular endothelial damage; and
- Reduced urinary output caused by acute vasospasm.

2.8 PREVENTION OF HYPERTENSION IN PREGNANCY

Pregnancy induced hypertension is a criterion for referral to either level 2 or level 3, depending on the severity of the disease. The midwife's role is to promote health; prevent disease by making a midwifery diagnosis; initiating treatment and to refer promptly before complications arise; and to rehabilitate the woman after the disease. The midwife has the following responsibilities to ensure that proper care is given to the pregnant woman (DOH, 2001:50):

- Encourage all pregnant women to attend antenatal care clinics so that screening for PIH can be done and abnormal conditions be detected early and to intervene promptly;
- Educate patients on the importance of informing health care providers about the past obstetrical history;
- Explain the need to start antenatal care early, that is, at three months or as soon as the woman realizes that she has missed a period because of the possible recurrence of PIH;
- Education should also include the five 'danger signs' listed below, which should be reported to the midwife when attending for antenatal care, or be reported as soon as they occur, even if the woman is not due to return to the antenatal clinic.
    - Severe headache; convulsions; blurring of vision;
    - Abdominal pain;
    - Vaginal bleeding;
    - Reduced foetal movements; and
    - Drainage of amniotic fluid from the vagina.
- Health care providers should be aware of risk factors for developing hypertension or its complications;
- The health care provider should have knowledge on how to use drugs for the management of acute hypertension so as to prevent complications from occurring;

- Health care providers should also be alert to the high blood pressure in pregnancy, that is, blood pressure of $^{140}/_{90}$ mmHg and above, so as to diagnose its onset at the earliest possible moment. Blood pressure is expected to drop during pregnancy, due to physiological changes in the circulatory system of the mother;
- Magnesium sulphate must be available at all antenatal care facilities and emergency service facilities, and midwives are required to have the required knowledge to administer it;
- Criteria for referral and referral systems should be known to health providers and emergency transport must be available for all pregnant women who experience complications at any site.

2.9 MANAGEMENT OF THE WOMAN WITH PIH AT LEVEL ONE

When a woman is pregnant, the important factor is for the condition of pregnancy-induced hypertension (PIH) to be identified as soon as possible, so that effective treatment can be initiated as there is no effective method of preventing PIH and the most effective treatment of severe PIH is termination of pregnancy (De Kock & Van der Walt, 2004:20-4). The midwife should diagnose PIH early, refer the woman to the doctor for treatment and follow up the woman at the antenatal care centre to reduce maternal morbidity and mortality.

2.9.1 Management of mild and moderate PIH by the midwife at level 1

Mild PIH is defined as blood pressure of $^{140}/_{90}$ mmHg, or a diastolic blood pressure of less than a 100 mmHg, according to De Kock and Van der Walt (2004:20-7), no proteinuria and oedema+ (DOH, 1998:76). The affected woman should be given the following:

- A loading dose of methyldopa 1g orally; and
- She should be referred to the level-2 hospital on the same day (DOH, 2007:82).

With the management of a woman without proteinuria and other symptoms besides elevated BP, when this is less than 160/110 mmHg, the following should be done:

- Advise the woman to rest;
- Find out about home surroundings and availability of transport;
- The woman should be reviewed after 2 to 3 days to assess the progress of the condition;
- If there is doubt about the management, the woman should be referred to hospital (DOH, 2006:63);
- Educate the woman about diet, explain to her not to have extra salt, follow a diet that is low in carbohydrates and high in vitamins and proteins;
- Urine must be tested weekly for the presence of protein in the urine;

- Blood pressure must be measured on a weekly basis;
- Foetal movements must be monitored daily;
- The foetal condition must be monitored using a cardiotocograph (CTG) on a weekly basis.

According to Fraser, Cooper and Nolte (2006: 342), the following assessment should be done at each visit:

- Weigh the woman to assess weight gain to determine excessive weight which could indicate oedema.

The woman should be educated about the five pregnancy 'danger signs' and urged to report them to the clinic or hospital, with the antenatal card, as soon as they occur. These signs are (DOH, 2002: 24):

- Severe headache, blurred vision or visual disturbance;
- Vaginal bleeding;
- Reduced foetal movements;
- Abdominal pain; and
- Drainage of amniotic fluid from the vagina.

2.9.1.1 Elaboration of danger signs

- Severe headache

Severe headache which is persistent and frontal in location is due to cerebral oedema and could be indicative of imminent eclampsia (Fraser, Cooper & Nolte, 2006:344).

- Vaginal bleeding

One of the causes of vaginal haemorrhage during pregnancy is premature separation of the placenta from the uterine wall while the foetus is still in the uterus. The condition is common in pre-eclampsia (Berkow, 1999:1158). Vaginal bleeding could be an indication of placenta praevia, lesions of the cervix or vagina and an abruption of the placenta (Fraser, Cooper & Nolte, 2006:261).

- Reduced foetal movements

Reduced foetal movements occur in a compromised foetus. The woman should be advised to count foetal movements and not just kicks for an hour at the same time every day. If fewer than four movements occur in one hour, the count should be repeated at the same time the next day. If the foetal movements are four per hour or fewer after about a week of counting, the counting should be continued for another hour. If still fewer than four, the woman should go to the clinic or hospital for an assessment of foetal wellbeing

by a cardiotocograph (CTG) machine (DOH, 2002:76). Reduced foetal movements indicate foetal distress or compromise. Patterns of foetal movements are a reliable sign of foetal wellbeing. The foetus should make at least 10 movements per day; if the foetus is taking longer to achieve 10, it could be in danger and the mother must visit the health centre (Fraser, Cooper & Nolte, 2006:260).

- Abdominal pain

Abdominal pain is common in pregnancy and is suffered by almost all women. The two types of pain are pregnancy specific and incidental, pathological or non pathological. Many abnormalities are indicated by abdominal pain, for example, heartburn, excessive vomiting, ectopic pregnancy, placental abruption, severe pre-eclampsia and urinary tract infection, to mention just a few (Fraser, Cooper & Nolte, 2006:284; De Kock & Van der Walt, 2004:26-6; 27-5).

- Drainage of amniotic fluid from the vagina

Drainage of amniotic fluid from the vagina is a sign of premature pre-labour rupture if the woman is not in labour. During pregnancy, rupture of membranes is associated with cervical incompetence, infection, preterm labour, antepartum haemorrhage, malpresentation, cord prolapsed, oligohydramnios and psychosocial problems as a result

of hospitalisation for a long time (Fraser, Cooper & Nolte, 2006:302; De Kock & Van der Walt, 2004:26-4; DOH, 2002:102).

Rest – as much as possible – is recommended and if the woman does not get enough rest at home she may be admitted to hospital to ensure enough rest (Fraser, Cooper & Nolte, 2006:342; Theron, Woods, Greenfield, Louw & De Groot, 2006:3-23).

2.9.1.2 Special investigations

As recommended by DOH (2007:82), investigation of the following is important:

- Elevated serum urea and creatinine denotes renal damage;
- Full blood count (FBC) and platelet count. Platelets will be low due to disseminated intravascular coagulation (DIC);
- Increased serum uric acid denotes renal damage;
- Asparate transaminase (AST) is done in severe pre-eclampsia and eclampsia and indicates altered liver function. The investigation is done to have a baseline to refer to in the future, as the condition worsens, and to assess the severity of PIH.

2.9.2 Management of mild to moderate PIH by the doctor at level 1

As discussed by De Kock and Van der Walt (2004:20-6), the woman should be admitted if the following is observed:

- Protein in urine after testing;
- Development of symptoms of imminent eclampsia;
- Reduction of foetal movements;
- Ultrasound scans should be done to assess the volume of liquor amnii due to intra-uterine growth restriction;
- Assess foetal breathing movements or blood flow using Doppler velocimetry to determine placental blood flow;
- Deliver the woman at 38 weeks of pregnancy in the case of suboptimal utero-placental circulation.

According to DOH (2001:51; 2002:77), the woman should be given antihypertensives as prescribed by the doctor. If she has moderate hypertension, Aldomet 500 mg b.d. orally up to a maximum of 750 mg t.d.s. daily should be prescribed. Nifedipine 10 mg is given orally three times a day to a maximum of 30 mg if the diastolic BP is > 110 mmHg. A maintenance dose of Prazosin 1 mg is given orally three times daily up to a maximum of seven mg three times daily should be added.

2.9.3 Management of severe PIH and imminent eclampsia at level 1 clinics

The management of severe PIH and imminent eclampsia is the same, as the aim is to stabilise the woman's condition before she is transferred to either level 2 or 3. The dangers that threaten the woman's life at this stage are the development of eclampsia or intracerebral haemorrhage (Woods *et al.*, 2006:3-28). Severe PIH is defined as an increased blood pressure where the diastolic blood pressure is more than 110 mmHg on two occasions at least 20 minutes apart (DOH, 2007:82).

2.9.3.1 Management of severe PIH and imminent eclampsia at level 1 by the midwife

According to the guidelines for the management of PIH by midwives at level 1, the following is expected (DOH, 2007:82):

- Insert an indwelling Foley's catheter to assess the hourly urinary output, and ensure that the urine output is not less than 0.5 ml/kg/hour;
- Measure BP hourly to assess effectiveness of administered drugs;
- Take blood for AST and LDH to assess liver functioning; urea, creatinine and uric acid to assess renal damage; and blood for full blood count (FBC) to assess the extent of the damage in the circulatory system including the platelet count;
- Assess the foetal size and age, using palpation and the CTG for monitoring foetal

condition;

- If gestational age is less than 34 weeks and estimated foetal weight is less than 2 kg, birth should be delayed, if possible;
- Give a loading dose of methyldopa 1g orally to lower raised blood pressure;
- Give Nifedipine 10 mg orally to be swallowed or taken sublingually and not chewed; this can be repeated after 30 minutes;
- Give magnesium sulphate 4 g diluted with 12 ml normal saline and given slowly intravenously over 4 minutes, with 5 g given intramuscularly (IMI) into each buttock with 1 ml of lignocaine 1 %. Magnesium sulphate will be continued four-hourly IMI with 5 g into alternate buttocks with 1 ml of lignocaine 1 %. If the patellar reflexes are absent, respiratory rate is less than 16 breaths per minute and urinary output less than 0.5 ml/kg/hour, magnesium sulphate should be stopped;
- Observe for signs of magnesium sulphate toxicity which are absent patellar reflexes and a feeling of extreme weakness and decreased respiratory rate. If the above signs are present, give calcium gluconate 10 % 10 mls slowly intravenously (DOH, 2007:82).
- After the woman's condition has been stabilised, urgent transfer to either level 2 or 3 should be arranged;

Report signs of imminent eclampsia immediately to the doctor, if present. The signs are:

- Pain experienced over the liver;
- Report of severe headache by the woman;
- Presence of pulmonary oedema characterised by dyspnoea and cyanosis;
- Blood pressure of more than 160/110 mmHg despite treatment with the presence of 3+ or more protein in urine and severe oedema;
- Marked oliguria, urinary output less than 30 mls per hour;
- Presence of the tendency to rub the nose, spots before the eyes or difficulty in focusing; all these characterise restlessness, irritability, hyperreflexia and visual phenomena (Fraser, Cooper & Nolte, 2006:343); and

The condition and the importance of referral to hospital should be explained to the woman and partner to gain full co-operation.

2.9.3.2 Management of severe PIH and imminent eclampsia by the doctor at level I

The following are expected of the doctor at level I:

- If the gestational age is less than 34 weeks or estimated foetal weight less than 2 kg, steroids, betamethasone 12 mg must be given intramuscularly to the woman to enhance foetal lung maturity. After 24 hours a second dose must be administered to prevent the danger of hyaline membrane disease. Delay labour for 24 to 48 hours to allow steroids to take effect;
- The foetus must be delivered if the clinical assessment or ultrasound foetal size indicates more than 34 weeks of pregnancy or the duration of pregnancy not

known;

- If the presentation is abnormal or foetal distress is present, a caesarean section should be performed (Woods *et al.*, 2006:3-37);
- If the gestational age is 26 to 33 weeks or estimated foetal weight is 900 to 1500 g and there are no indications for delivery, conservative management should be practised, but intra-uterine death due to foetal distress as a result of abruption of the placenta should be prevented; and
- Delivery should take place in hospitals with facilities for managing severe eclampsia and very low birth weight babies (DOH, 2007: 82).

2.9.4 Maximal safety for the patient during transfer to hospital

The following need to be ensured so as to ensure maximal safety of the patient whilst being transferred to hospital:

- The woman should be accompanied by a doctor or midwife to the next level of care;
- Monitoring of both maternal and foetal conditions should continue while being transferred in the ambulance;
- The doctor or midwife accompanying the woman should have the following as additional aids:

- Magnesium sulphate;
- Dihydralazine or nifedipine;
- Calcium gluconate; and
- Resuscitation equipment.

If the BP of the woman should rise to 110 mmHg diastolic or more, nifedipine 10 mg or dihydralazine 6.25 mg IMI should be given orally.

If the woman has a convulsion in the ambulance, magnesium sulphate 2 g should be administered intravenously over five minutes. The dose may be repeated once only. If more than 4 hours have passed after the administration of the loading dose, further maintenance doses of magnesium sulphate must be given (Wood *et al*., 2006:3-30).

2.9.5 Management of the patient with eclampsia by the midwife at level 1

In many cases, the woman is brought to the clinic either having convulsions or with a history of convulsions at home for the first time while pregnant. The patient is usually either unbooked or not aware of the pregnancy. When such situations prevail, the midwife at level 1 is expected to act according to her scope of practice to prevent complications to both the mother and foetus. The management should be in accordance with the following principles (DOH, 2007:85):

- Apply first aid measures;
- Control convulsions;
- Prevent further convulsions;
- Reduce extreme hypertension;
- Do laboratory and clinical assessment;
- Expedite delivery; and
- Practise postpartum care.

The relatives, partner or patient, if conscious after the convulsion, should be informed about the condition and reassured to allay anxiety. Emotional support at this time is important (Fraser, Cooper & Nolte, 2006:347).

All health care facilities rendering services to pregnant women in SA should have an eclamptic box containing equipment for the immediate management of the woman with eclampsia. The eclamptic box should contain the following (DOH, 2006:67):

- Magnesium sulphate;
- Intravenous drip equipment;
- An indwelling urinary catheter;
- Calcium gluconate;
- Aldomet;
- Appropriate strapping;

- Different sizes of syringes;
- 200 ml of normal saline;
- Venflows or equivalent;
- Fact sheet on management principles of eclampsia; and
- Rapid-acting antihypertensive agent.

The midwife should carry out the following actions:

- Turn the woman onto her left lateral side to improve foetal circulation;
- Clear the airway and remove secretions, vomitus and dentures and insert an airway;
- Administer 40 litres of 100 % oxygen by face mask to improve oxygenation to the foetus;
- Prevent injuries by using cot sides and removing sharp instruments; and
- Insert an indwelling urinary catheter to measure urinary output and to obtain a specimen for urine analysis.

The woman should be transferred to a tertiary hospital where there is enough equipment for further management and personnel to attend to the patient. Magnesium sulphate 4 g diluted with 12 ml normal saline and given slowly intravenously over four minutes, 5 g into each buttock, and given with 1 ml of lignocaine 1 %. Thereafter 5 g should be administered into alternate buttocks 4-hourly, with 1 ml of lignocaine 1 %.

The following should be checked as precautionary measures before administering the magnesium sulphate maintenance dose:

- Patellar reflexes should be present;
- Urinary output should be 30 mls or more per hour; and
- Respiratory rate should be 16 b/m and more; if the above signs are abnormal, magnesium sulphate should be stopped and the patient should be assessed for signs of overdosage;
- If restlessness and convulsions persist, an additional 2 g magnesium sulphate should be given intravenously, or clonazepam 1 g over 5 minutes (DOH, 2007: 86). The dosage should be repeated once if convulsions continue.
- Monitor blood pressure and state of consciousness of the woman hourly; and
- The midwife should notify the doctor or the advanced midwife of any change in the woman's condition.

2.9.6 Management of the patient with eclampsia after fits have been controlled at level 1

The following is expected of the midwife:

- Monitor blood pressure and state of consciousness of the woman hourly;
- Control BP if more than 160/110 mmHg by preloading the patient with 200 To 250 ml Ringer's lactate solution over 20 minutes;

- A loading dose of methyldopa 1g orally should be given;
- Administer nifedipine 10 mg orally, to be swallowed; repeat after 30 minutes if necessary, but do not give more than 30 mg in 24 hours (DOH, 2007:85; Fraser, Cooper & Nolte, 2006:347);
- Monitor urinary output hourly, as well as respiratory rate;
- Assess the foetal condition using the cardiotocograph machine and interpret the results;
- Intravenous fluid or Ringer's lactate or a normal saline solution should be continued at a rate of 80 ml per hour;
- The baby should be delivered immediately after the convulsions. The midwife should do per vaginal examination to assess the dilation of the cervix; if the woman is fully dilated, vacuum extraction should be done. Prepare the woman for caesarean section if there are signs of foetal distress or the cervix is unfavourable for induction of labour.
- Blood samples for FBC, urea, creatinine, AST and clotting profile should taken and sent to the laboratory for analysis;
- The monitoring will also depend on the state of the patient;
- Magnesium sulphate should be continued for 24 hours after birth or the last convulsion, whichever is last; and
- The woman should be transferred as soon as possible to a level 2 or 3 hospital where there are enough personnel and equipment for further management.

2.9.7 Management of the patient with eclampsia by the doctor at level 1

The following is expected of the doctor at level 1:

- If feasible, a central venous pressure line should be inserted to monitor fluid volume;
- Induce labour if the cervix is favourable; and
- Perform a caesarean section if there is foetal distress or unfavourable cervix or obstetrical indication.

2.10 MANAGEMENT OF PIH AT LEVELS TWO AND THREE

2.10.1 Management of the patient with eclampsia at level 2 or 3 by the midwife

According to Nolte (1998:293), if the patient is hospitalised, bed rest and limitation of visitors should be instituted. A full history is to be taken, followed by a physical examination.

The observations to be made are as follows:

- Blood pressure, temperature and foetal heart rate should be checked four- to six-hourly, or more frequently when necessary;
- The degree of oedema should be assessed twice daily;

- The maternal mass must be measured daily so as to assess degree of oedema;
- The foetus is monitored by doing a twice daily non-stress test and foetal kick counts;
- The urine should be tested for specific gravity, presence of protein and blood twice daily;
- A strict intake and output chart must be kept;
- Any abnormality noted should be reported to the doctor immediately;
- The patient should be given a normal balanced diet;
- Fluid intake need not be restricted; and
- The woman should be encouraged to count foetal movements daily, as these indicate the foetal condition in the uterus and these have to be recorded.

2.10.2 Management of the patient with eclampsia at level 2 or 3 by the doctor

The following are expected of the doctor:

- If the gestational age is 28 to 34 weeks, two doses of betamethasone 12 mg should be administered intramuscularly, 12 hours apart. This is done so as to stimulate lung maturity in the immature foetus.
- The investigations to be done include a full blood count (FBC); liver function test (LFT), serum urea, creatinine and uric acid (24-hour urine specimen).

According to Cooper, Fraser & Nolte (2006:347) anticonvulsant therapy for the management of convulsions should be prescribed. The drugs of choice are magnesium sulphate, diazepam and phenytoin. Magnesium sulphate is the recommended drug, rather than the other two, because it helps in vasodilation, thus reducing cerebral ischaemia. Phenytoin is preferred to diazepam as it does not have sedative effects. Magnesium sulphate administration is according to the protocol. Antihypertensives are prescribed to control increased blood pressure.

Delivery should be considered if the foetal and maternal conditions worsen or if any of the following are present (DOH, 2002:76); (DOH, 2001:51):

- Cerebral oedema;
- Pregnancy of more than 34 weeks;
- Pregnancy of more than 32 weeks and severe PIH;
- Estimated foetal weight of more than 1,5 kg and severe PIH;
- Foetal distress;
- Dead foetus;
- Suspected placenta abruption;
- Eclampsia;
- Uncontrollable blood pressure which persistently is more than 160/110 mmHg;
- Platelet count persistently less than 100 000 unit mm□;
- Persistently rising uric acid level of more than 0.45 mmol/l;

- HELLP syndrome; and
- Renal dysfunction (urea more than 8 mmol/l, creatinine more than a 100mmol/l and urine output of less than 500 ml in 24 hours).

The midwife should be able to assess foetal size by palpation and assess foetal condition by means of a non-stress test. The baby should be delivered as soon as possible, so as to prevent intra-uterine death and further complications to the mother.

2.10.3 Management of delivery by the midwife

Patients with severe pre-eclampsia and eclampsia often present at a level-1 health care facility in established labour. The ideal place for delivery of such patients is a level 3 health facility, but when labour is inevitable, the midwife will have to conduct labour to prevent complications and maternal morbidity and mortality. Care of the woman during labour will be described under the stages of labour, which follow:

2.10.3.1 First stage of labour

The midwife should implement the following midwifery management in the first stage of labour (DOH, 2001:29):

- First seek advice from the referral health care facility and carry out orders;
- Use a partogram, which is a document that gives information about the patient, maternal and foetal conditions during labour and the progress of labour.
- Measure blood pressure half hourly, so as to detect abnormalities early;
- Continue with the maintenance of magnesium sulphate if signs of imminent eclampsia are present;
- Assess foetal heart rate half hourly using a foetal scope before, during and after a contraction to exclude decelerations or use the cardiotocograph (CTG) machine;
- Watch the woman for a change in mental state or alertness, so as to assess for central nervous system complications;
- Give adequate pain relief: the standard narcotic for analgesia in labour is parental pethidine 100 mg with promethazine, intramuscularly, 4-hourly;
- Intravenous fluids should be given at a rate of 80 ml per hour to prevent overloading (DOH, 2007:87).
- Have emergency treatment in readiness in case resuscitation or further management is needed; equipment should be in good working order;
- Assess progress of labour; if there is a delay, transfer to either level 2 or level 3 health care facility;
- Consider transferring the woman if there is poor progress of labour;
- Progress of labour is monitored at due times, that is, a vaginal examination is done 4-hourly, and 2-hourly if there is evidence of foetal distress. Progress of

labour is prolonged when cervical dilatation proceeds at a rate of less than 1 cm in a primigravida/nullipara and less than 1,5 to 2 cm in gravida two and above (Cronje, in Bassin, 1996:57). Contractions are assessed half-hourly, the duration and frequency noted and recorded. The normal contraction rate comprises having three contractions lasting between 40 and 60 seconds in 10 minutes in the active phase of labour. If there is a need for augmentation of labour, fluid should be administered as follows (DOH, 2007: 87):

- Add oxytocin 5IU to 200 mls Ringer's lactate and start infusion at a rate of 5 ml per hour. The rate should be doubled as 5, 10, 20, 40, 80 ml/hour every 30 minutes until three to four strong contractions are achieved. If the desired effect is not achieved, a new infusion with oxytocin 10 units in 200 mls Ringer's lactate at a rate of 40 ml/hr should be started;
- Descent of the foetal head is described by some authors in fifths above the pelvic brim, and is checked abdominally by palpation and confirmed by bimanual per vaginal examination (Nel 1995; Cronje, in Bassin, 1996:58).

2.10.3.2 Second stage of labour

The second stage of labour starts at the end of the first stage of labour when there is full dilatation of the cervix and ends when the baby is born. The midwife should notify both the obstetrician and the paediatrician of the progress of labour. The second stage of

labour should be as short as possible, therefore either vacuum or forceps delivery will be performed. If the maternal and foetal condition deteriorates during the first stage of labour, the doctor, if present, will undertake a caesarean section on the woman. If the doctor is not present, the patient will be transferred to level-2 health facility, if birth is not possible. The midwife will continue observing the patient and the foetus until delivery has taken place. Observation includes the following:

- The midwife should ensure good progress of labour;
- Measure blood pressure quarter hourly; and
- Listen to foetal heart after every contraction to assess any decelerations at 15-minute intervals;
- Perform vacuum extraction if diastolic BP $\geq$ 110 mmHg.

If a relative or next of kin is present, full explanation of the patient's condition should be given and such a person must be informed about the patient's progress.

After delivery of the anterior shoulder of the neonate, or after the delivery of the neonate, the woman is not given syntometrine or ergometrine because both stimulate a sustained contraction that will lead to an increase in BP; oxytocin is preferred. Initial administration of oxytocin should be 5 units intravenously, followed by 20 units in 200 ml vacoliter to be infused slowly (DOH, 2006:65).

2.10.3.3 Third stage of labour

The third stage starts immediately after the delivery of the baby and ends when the placenta, membranes and the cord are delivered. Active management of the third stage of labour will be done to shorten the period of delivery of the placenta, membranes and the cord. The third stage will be managed by controlled cord traction. Following birth, the woman should be nursed in a high-care unit where antihypertensive treatment will be continued for 24 hours. The woman should never be left alone (DOH, 2007:11). Midwifery care will continue as follows during the third stage (DOH, 2006: 65):

- Postpartum haemorrhage is prevented or controlled by continuing with the oxytocin infusion as indicated above;
- Magnesium sulphate infusion is continued for 24 hours;
- The midwife checks the blood pressure immediately after birth, every 30 minutes for 4 hours and two-hourly thereafter;
- Blood pressure should be controlled between 140/90 and 150/100 mmHg; and
- Urine output should be measured hourly.

2.11 MANAGEMENT OF THE WOMAN WITH PIH DURING THE POSTNATAL PERIOD

The puerperium is the period following the delivery of the placenta, the membranes and the cord lasting up to six weeks or 42 days after delivery. Serious complications can occur during this period; for this reason the woman should be monitored and observed very carefully during the puerperium. The midwife should observe the temperature, pulse, urine output and blood pressure half hourly, do pad checks for amount, odour, consistency and colour of lochia and monitor the contraction of the uterus one hour following delivery to exclude postpartum haemorrhage and other abnormalities.

If the blood pressure is elevated during the puerperium, the woman should be transferred to a tertiary health care facility for further management. The midwife should arrange transport for the patient and accompany her to the hospital. The woman will be admitted to a high-care pueperium ward where midwifery care should continue as follows:

- Observe the woman carefully for the first 24 hours post delivery as there is potential danger of eclampsia developing into severe pre-eclampsia (Fraser, Cooper & Nolte, 2006:346);
- Continue with the maintenance dose of $MgSo_4$ for 24 hours to prevent convulsions (DOH, 2001:30);
- Measure BP immediately after delivery, as it may be affected by the bearing down

of the woman and may be low if there is postpartum haemorrhage. Blood pressure should be controlled between $^{140}/_{90}$ and $^{150}/_{100}$ mmHg;

- Blood for FBC, urea and creatinine should be taken a day following birth to assess the progress of the condition; a return to normal is expected (DOH, 2007:86);
- Advise the woman on contraceptives and suggest the method suitable for her condition; if she feels that she has completed her family the midwife may motivate for sterilization.
- On discharge, at least three days after birth, the woman is reminded about attending follow-up after one week and then at three weeks, six weeks and twelve weeks after birth at the level-3 health care facility. Specific dates should be given (DOH, 2006:65). The mother should be reminded to bring the baby along and encouraged not to forget the 'road to health card' (RTHC).
- The patient should be advised to continue the prescribed antihypertensive drugs and to visit her closest level-1 health centre weekly for blood pressure measuring and also when she feels that something is wrong with her or the baby (DOH, 2007:11).
- Diuretics may be prescribed, if necessary, for example, hydrochlorothiazide 25 mg orally (DOH, 2007:88).
- The patient should be encouraged to wear elastic stockings to prevent deep vein thrombosis;

- The baby should be nursed in a high-care neonatal unit; if the partner is present, he can accompany the baby to encourage early bonding. If the mother's condition permits, she should be wheeled to the nursery to see her baby, or if the condition of the baby is satisfactory, the baby may be taken to the mother (Fraser, Cooper & Nolte, 2006:348).

2.12 INDICATIONS FOR TERMINATION OF PREGNANCY

Termination of pregnancy refers to purposeful ending of pregnancy to expel the non-viable foetus. Viable foetus in South Africa is when the foetus has completed six months of gestation, about 24 weeks or 500 g (Cronje & Grobler, 2007: 239). Termination of pregnancy is performed for many reasons that will not be discussed in detail in the study. Amongst the indications, termination of pregnancy can also be performed where continued pregnancy would endanger the life of the woman, pose a risk of injury to the foetus and in the presence of severe foetal abnormalities (De Kock & Van der Walt, 2004:27-2). The indications highlighted below are those which could endanger the life of the pregnant woman (DOH, 2006:66):

- Severe hypertension at 34 weeks and more of pregnancy;
- Uncontrolled hypertension;
- Intra-uterine growth restriction of the foetus, after consultation with another

experienced doctor or midwife;

- Severe pre-eclampsia that does not respond to expected management prior to 24 to 26 weeks of gestation;
- Before 28 weeks, on request of the woman or on doctor's advice;
- Renal failure;
- Thrombocytopenia associated with pre-eclampsia;
- Severe eclampsia; or
- HELLP syndrome, HELLP being the acronym for haemolysis, elevated liver enzymes and low platelets.

2.13 COMPLICATIONS AND PROGNOSIS

Complications of hypertension in pregnancy can be divided into maternal and foetal complications as hypertension in pregnancy can affect both mother and foetus.

2.13.1 Maternal complications

The complications occurring in the mother affect the vital organs in such a manner that, if not recognised and treated early, permanent damage could result, leading to either organ

dysfunction or the death of the woman:

- The mother may develop tonic/clonic convulsions if the signs and symptoms of imminent eclampsia are not identified and managed;
- Injuries may be sustained due to convulsions;
- Stroke can occur due to central nervous system irritability and cerebral damage;
- Hypertensive encephalopathy can develop in 1 to 2% of cases;
- Cerebral haemorrhage, which is usually the cause of death, is possible;
- Hyperthemia;
- Cortical blindness;
- Psychosis;
- Aspiration of stomach contents after vomiting (Mendelson's syndrome);
- Pulmonary oedema;
- Hepatic failure and jaundice;
- Renal failure;
- Placental abruption, a condition characterised by vaginal bleeding due to premature separation of the normally situated placenta while the foetus is still in the uterus;
- The woman with PIH can also develop subcapsular hepatic syndrome as a result of the reduced hepatic flow, and hepatic haemorrhage because of the oedematous swelling of the liver; and disseminated intravascular coagulation is caused by the release of thromboplastin;

- In severe or uncontrolled cases of PIH, the affected organs exhibit a collection of signs and symptoms leading to the condition known as the HELLP syndrome. HELLP stands for haemolysis elevated liver enzymes and low platelets (Cronje & Grobler, 2006:513; De Kock & Van der Walt, 2004: 20-7).

Maternal complications secondary to hypertension in pregnancy that were identified through a study conducted by Buga and Lumu at UGH are presented in Table 2.1

Table 2.1: Maternal complications of hypertension (N = 760)

Complications	% of complications recorded from Jan 1993 to Dec 1994
Eclampsia	15 % (n = 114)
Abruptio placentae	1.7 % (n = 13)
HELLP syndrome	1.2 % (n = 9)
DIC	0.5 % (n = 4)
Maternal mortality	1.0 % (n = 8)
Pulmonary oedema	3.9 % (n = 30)
Acute renal failure	0.9 % (n = 7)

2.13.2 Foetal complications

According to Mateyise (1996:73, 115), PIH was found to be related to neonatal and perinatal mortality. Neonates born to mothers with PIH were more likely to be diagnosed with hypoxic ischaemic encephalopathy (HIE), meconium aspiration syndrome (MAS), hyaline membrane disease (HMD), stillbirths, intra-uterine hypoxia and neonatal birth asphyxia.

The foetuses of mothers suffering from hypertension in pregnancy are more likely to suffer from intra-uterine growth restriction and asphyxia neonatorum due to insufficient blood flow to the placental bed. Preterm labour is very common in PIH due to uncontrolled blood pressure, foetal distress or deterioration in maternal condition, and induction of labour or caesarean section will be performed. Prematurity exacerbates the perinatal morbidity and mortality rate as the body organs of preterm babies are not sufficiently mature (Cronje & Grobler, 2006:506). According to Nolte (1998:23), complications attributable to PIH include acute foetal distress or intra-uterine death.

Buga and Luma (1999:219) identified numerous foetal and neonatal complications at the Umtata General Hospital in the Eastern Cape between January 1993 and December 1994. These are listed in Table 2.2, below. The complications that developed during the period of the research included intra-uterine growth restriction (IUGR), low birth weight (LBW), preterm births and neonatal death. Fibrin and platelet aggregation formation in the uterine

spiral arterioles lead to reduced blood flow to the foetus, causing foetal hypoxia and infarcts. The amount of oxygen available to the foetus, as well as nutrients, is reduced, resulting in IUGR and LBW. Preterm births also result from induced labour when this is necessary because the pregnancy endangers the life of both the mother and the foetus. In addition, neonatal deaths result from antepartum haemorrhage as a result of abruptio placentae (De Kock & Van der Walt, 2004:20-6).

Table 2.2: Perinatal complications of hypertension.

Complications	No.of complications recorded from Jan 1993 to Dec 1994	% of complications from Jan 1993-Dec 1994
Intra-uterine growth restriction	50	6.6 %
Preterm deliveries	257	34 %
Low birth weight	151	19.9 %
Neonatal death	26	3.8 %
Intra-uterine death	85	11.2 %

In the United States PIH complicates 6.8 % of pregnancies, is responsible for 15 % of maternal mortality and also ranks second to embolic events (Peterson, 1997:1)

2.14 CONCLUSION

The above discussion reflects common issues which arise as a result of PIH. Pregnancy-induced hypertension (PIH) cannot be prevented, but if the presence of predisposing factors is detected early and diagnosis made immediately, the complications to both the mother and the foetus could be prevented. Prompt referral of patients with signs and symptoms of PIH to either a secondary or a tertiary health care facility for a second opinion should be made without delay. Follow-up of clients suspected of developing PIH before and after birth should be done by a midwife. The midwife's role is to monitor the woman for five to seven days after birth, according to her scope of practice as determined by Nursing Council regulation R2488. Where the situation does not allow her to discharge the woman after seven days, care must continue until the blood pressure is low, oedema subsides and no protein is detected in the urine.

The chapter following this literature review will deal with the methodology followed for this research project.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The aim and objectives of the study were achieved through the use of a quantitative, descriptive and contextual research design. The research method comprised a retrospective review of the records of patients who were referred for further management of PIH to a level-3 health care facility by midwives from level-1 health facilities. The sample size was 291. The steps followed to collect data, analyse data, interpret the results and formulate recommendations are elaborated upon in Chapter 3.

The study was conducted at Frere Hospital. This hospital is a referral and tertiary institution in East London. The hospital serves rural, urban, peri-urban and informal settlement communities. The hospital is in the Amatole district.

The aim of the study was to determine the implementation of the *National Guidelines for Maternity Care* for the management of PIH by the midwife at level 1,with the intention of making recommendations for midwifery management of PIH at level 1 to reduce maternal mortality and morbidity due to PIH.

3.2 RESEARCH DESIGN

A research design indicates the way the researcher plans and structures the research process (Mateyise, 1996:61). Cluett & Bluff (200:19) define a research design as the detailed plan of how the research was to be conducted. The term design is used interchangeably with method by some researchers. The design may be unique to a study and well established.

3.2.1 Quantitative design

A quantitative study is a scientific way of acquiring information by working in a systematic way. This study is a quantitative study as the researcher scientifically and systematically acquired information to full fill the purpose of the study. Information was gathered step by step according to a pre-specified plan of action (Polit *et al*., 2001:13). Quantitative research involves collecting data that can be analysed numerically, explaining and describing events or characteristics in an objective and numerical manner (Cluett & Bluff, 2000:215). According to Brink (1998:5), quantitative research can be described as data structured in the form of numbers. For this project, the researcher undertook step-by-step collection of information regarding the implementation of guidelines for the management of PIH patients at level-1 health care facilities by midwives. Data collected was analysed numerically.

3.2.2 Descriptive design

The study was descriptive as it was non-experimental and the purpose was to observe, describe and document aspects of the situation (Polit *et al.*, 2001:80). The description involved the prevalence, incidence, size and measurable attributes of the phenomenon (Polit *et al*., 2001:19). As explained by Burns *et al*. (2001:248) such a study may be used for the purpose of identifying problems with current practices. A descriptive design was used to describe the implementation of the *National Guidelines for Maternity Care* for the management of PIH by midwives at level-1 facilities.

Information regarding the demographic data, antenatal care given to women during pregnancy, identification of patients at risk and specific midwifery actions taken when the patient was found to have an elevated blood pressure were described.

3.2.3 Contextual design

The research design was also contextual. According to Mouton (2002:133), contextual design involves the extensive description of the phenomenon in its specific context.
Maternal care services are provided by midwives who function according to South African Nursing Council (SANC) regulations R2488, R2598, R387, R777 and R2418 and according to the Nursing Act, 1978 (Act 50 of 1978), as amended.

The study was focused on the one hundred and sixty-nine (169) clinics and five (5) community health centres in the Amatole District Council. Community health centres operate for 24 hours per day and offer maternal care. Out of the 169 clinics, only 30 provide maternal care. Patients are referred to levels 2 and 3 for further management when presenting with serious problems, such as PIH. Referrals to the Frere Hospital maternity section are also received from other districts such as U-Khahlamba, Chris Hani and O.R. Tambo.

3.3 RESEARCH METHOD

3.3.1 Introduction

A retrospective review of records was done. The records of patients referred by a midwife from level 1 to level 3 for further management of PIH were collected for this review. A retrospective study is a study in which some phenomenon existing in the present is linked to other phenomenon that occurred in the past. The independent variable cannot be manipulated (Polit *et al*., 1995:147). Brink et al. (1998:6) define a retrospective study as the measure of a design that has occurred earlier on.

The retrospective review of records was done to collect data. A checklist was used to collect data from the record of each mother referred from the level-1 health care facility

by a midwife. This record review was conducted by the researcher. All the records of patients who were admitted with PIH and met the criteria for inclusion were reviewed. In some instances, antenatal cards were not in the records but information was recorded; if the patient had been referred, those records were included in the study.

3.3.2 Population

Population refers to individuals in the universe possessing specific characteristics (De Vos, 2001:190). As described by Brink *et al*. (1996:132), a population is a group of objects or persons of interest to the researcher that meet the criteria the researcher is interested in studying. The population consisted of all patients admitted with PIH to the East London complex, Frere Hospital, from May 1999 to June 2003 whose the records were available. The target population comprised all pregnant women diagnosed with PIH referred by a midwife at a level-1 health care facility and transferred to a level-3 health care facility. Records of patients diagnosed with PIH at level 3 who referred themselves to the hospital and were not attending antenatal care at level-1 health care facility were not included in the study.

3.3.3. Sample and sampling

A sample is part or fraction of a whole selected by the researcher to participate in the research project. A sample consists of selected elements or units from a defined

population (Brink, 1996:133). According to Cluett and Bluff (2000:215), a sample is defined as the group of individuals selected from a target population as representative of that population. The sample for this investigation was identified by means of a labour ward register at Frere Hospital. The records of all the patients were retrieved by the researcher from where they were kept. The method that was used for sampling was purposive, because the chosen records were representative of the topic being studied. It consisted only of patients who received midwifery care and were referred via a level-1 health care facility by a midwife to level 3 upon diagnosis of PIH from May 1999 to June 2003.

The criteria for inclusion were as follows:

- All patients admitted with PIH referred from level 1 to level 3 and were managed by the midwife at level 1.
- Records of patients that were complete, that is, included an antenatal card, midwives' and doctor's records from level 1 and level 3.

- The following details had to appear on the antenatal clinic card:
- Personal details;
- Obstetrical history, both past and present;
- Social history;
- Gynaecological history;

- Surgical history;
- Past and present medical and any medical examination done;
- All the investigations that were carried out;
- Prophylactic treatment and treatment given;
- Observations done at each visit;
- Plot of the foetal growth and maternal condition.

Some records did not have the antenatal cards but the required information was recorded on the maternity case sheet or referral letter; such files were included in the study as the patient's notes were complete.

The following exclusion criteria applied:

Patients admitted to level 3 without having been seen by the midwife at level 1;
Patients who did not attend antenatal care at a level-1 facility; and
Patients who were unbooked.

3.3.4 Data collection tool

The research instrument was a checklist which was designed so as to address the aim and objectives of the study. All of the following documents were used to develop a checklist

of everything that is expected of the midwife when managing PIH and its complications at level 1.

- Maternal Death Assessor Control form designed and used by the NCCEMD;
- SANC's regulations for the practice of midwifery R2488, R2598, R777 and R387 and the Nursing Act, No 50 of 1978, as amended;
- Essential Drug List;
- The Guidelines for Maternal care in SA, a manual for clinics, community health centres and district hospitals;
- Saving mothers second report on Confidential Enquiries into Maternal Deaths in SA 1999 - 2001; and
- Midwifery textbooks.

The data collection tool was a check list. The design of the checklist used to collect data will be discussed below. The checklist was designed by the researcher and the following categories applied.

3.3.4.1 Section A

Demographic data of the patient was collected in section A of the questionnaire. Information required included the district the patient came from; date of admission to level 3; age of the patient; whether the patient was referred to level 3 or not; if referred, from which district? Was the patient transported to level 3? If yes, what was the type of transport used?

The information was important in order to determine the area from which the patient came, as that would give the researcher an idea of the distance from the health centre and availability of transport. In as far as districts were concerned, some have more clinics and level-3 hospitals than others. The age of the patient would give the researcher information about the group at risk of developing PIH and the parity. Thus the research could address the question of whether there was an association between the age and parity of the woman to develop PIH. Availability of transport would assist in determining the safety of both the mother and foetus en route to level 3 and whether the patient did actually go to the referred hospital or not.

3.3.4.2 Section B.

Section B of the checklist required the researcher to collect details about midwifery history taking. The section was divided into three sub-sections, as follows:

B -1 involved data collection from information pertaining to the antenatal care received by the woman at level 1 to identify the risk factors predisposing to PIH. The subsection elicited the following important factors:

Whether the woman attended antenatal care or not (booking status);

It was established whether the antenatal care card was available as patient's previous and present history helps the midwife identify the risk factors if they are present.

Gravidity of the patient, which is the number of times that the patient had been pregnant;

Parity, which is defined as the number of viable and live babies delivered by the woman; and

The status of the current pregnancy, whether singleton or multiple pregnancy.

B-2 of the checklist required the researcher to determine whether the midwife recorded risk factors for PIH. Risk factors for developing PIH were highlighted in Chapter 2.

B-3: In section B-3 the researcher was required to establish whether the midwife wrote the five danger signs in pregnancy on the antenatal card. The following danger signs were expected to have been recorded on the antenatal card as part of health education given to the patient during the antenatal period:

- Severe headache; blurring of vision; increasing oedema and convulsions and / or coma;
- Abdominal pain;

- Vaginal bleeding;
- Reduced foetal movements; and
- Spontaneous rupture of membranes.

3.3.4.3 Section C

In section C the researcher examined the midwife's ability to diagnose PIH at level 1. Section C was subdivided into subsections.

C-1 The researcher assessed the midwife's ability to diagnose PIH. The diagnosis would have been made on the following basis:

- Increase in blood pressure on two or more occasions at least 2-4 hours apart (DOH,2007:77);
- Increase in diastolic blood pressure by 15mmHg and systolic blood pressure by 25mmHg from pre-conception, more especially if the pregnancy has reached 20 weeks or more, or is accompanied by increase in mass of more than 0,5 kg per week or involves a sudden increase in mass of greater or equal to 1 kg per week (Cronje & Grobler, 2007: 498-499);
- Presence of protein when testing the urine of the woman (Cronje & Grobler, 2007: 499).

C-2 Required the researcher to evaluate whether the midwife detected secondary signs and symptoms of imminent eclampsia.

3.3.4.4 Section D

Section D required the researcher to describe the management of the woman with PIH at level 1. Section D was divided into subsections.

D-1 The researcher established whether the blood pressure at level 1 was < 160/110 mmHg, with no oedema, no proteinuria, no secondary signs and symptoms present. A yes or no answer block was provided for the response.

D-1.1 The researcher established the following:

Was the patient admitted or referred?

Was the patient started on antihypertensives?

Was the patient reviewed 2 to 3 days later at level 1 to assess the blood pressure?

The expected response was either a yes or a no answer.

D-2 The researcher established factors regarding the following:

Whether the blood pressure was > 160/110 mmHg or not at level 1;

Whether proteinuria, oedema or secondary signs and symptoms were present or not at level 1.

D-3 The researcher established whether the patient developed eclampsia at level l or not, and, if so, D-3.1 focused on the management of the patient with eclampsia at level 1.

3.3.4.5 Section E

In section E the researcher was required to determine whether the referral procedure of the patient with PIH from level 1 to level 3 was adhered to. Section E was subdivided into the following subsections.

E-1.1 The researcher determined whether the referral criteria were present at level 1.

The referral criteria listed as:

- Prematurity;
- Antepartum haemorrhage or abruption placenta;
- Lung oedema marked by dyspnoea;
- Underlying cardiac disease;
- Signs of poor coagulation;
- Prolonged coma or semi-comatosed or other central nervous system damage;

- Renal failure marked by urine output of less than 500ml in 24 hours

(DOH,2007:83).

E-1.2 The researcher established whether or not the patient was transferred from level 1-3.

E-1.3 The researcher established whether criteria for transporting the patient were met.

All the subsections required a yes or a no answer. Spaces for the researchers comments were provided. In emergency cases where the patient diagnosed with PIH arrived at level 1 at an advanced stage of labour, delivery would be allowed to continue if it was too late to refer the patient to the level-3 health facility. Delivery of the patient diagnosed with PIH would also be allowed to continue at level 1 if transport for a transfer was not available or delayed. Under normal circumstance, all patients diagnosed with PIH are referred to level-3 health care facilities for further management by the doctor; delivery should take place at the hospital.

Please refer to Annexure C for the data collection tool.

3.3.5 Data collection process

Data collection is the precise systematic gathering of information relevant to the research purpose or the specific objectives, questions or hypothesis of a study (Burns et al., 2001:794). Approval for using the patients' records was obtained from the Hospital management and the Ethics Committee of the East London hospital complex. No physical

presence of the patients was required, only the records. The researcher used a room for keeping of records to collect data. There was co-operation between the personnel of the hospital and help was obtained in accessing the records. The environment was conducive to data collection as it was seldom used and there was quietness that contributed to the researcher concentrating on data collection without being disturbed.

Data were collected by means of the above-mentioned checklist designed according to the objectives and purpose of the study. Data were collected by the researcher using one data collection tool for reviewing each record. Data collection commenced in the last two weeks of November 2003 and continued to mid December 2003 and included the whole month of February 2004. Initially, it took the researcher 45 minutes to complete a checklist, but as data collection continued, the pace improved to 15 minutes to review the record.

3.4 DATA ANALYSIS

Data analysis involves the manipulation of collected data for the purpose of drawing conclusions and reflecting on the ideas, interests and theories that led to the inquiry (Babbie, 1995:104). Quantitative data is analysed using statistical procedures which cover a broad range of techniques (Polit *et al*., 1995:36). Analysis was done with the help of a statistician. Raw data arranged in the form of a spreadsheet and saved on a compact

disc was given to a statistician for analysis. The statistician used a computer to analyse the raw data programme and statistical tests used. Descriptive statistics were used to summarise and describe data. After the results were tallied, data was presented in the form of frequency distribution data; interval data; nominal data; measures of central tendency where a mean was used; and simple statistics in the form of percentages (Brink, 1996:178).

3.5 PILOT STUDY

A pilot study is a trial run of the major study with the purpose of obtaining information to improve the research or assess its feasibility (Polit *et al*., 1995: 34). The actual conducting of the study on a small scale of 10 patients' records was done at the level-3 hospital to test applicability of the data collection tool. The data collection tool had to be adjusted after the pilot study. Following the pilot study, Section D-4 (Did the patient deliver at level 1?) was excluded because the 10 records used all showed that patients were referred to level 3 for further management.

3.6 VALIDITY AND RELIABILITY

Validity is the degree to which the instrument measures what it is supposed to be measuring (Polit *et al*., 2001; 308).

Content validity concerns how well the instrument represents all the different components of the variable to be measured (Brink, 1996:168). In order to ensure content validity, the

researcher used all available and accessible documents discussing the midwifery management of the patient with PIH at level 1 to design the tool. Literature review was done, after which essential aspects of the variables were included in the content of the data collection tool.

The data collection tool was then given to a group of midwives for their opinion on whether to include or exclude any information and to add whatever needed to be included in the tool, but was not asked by the researcher.

Predictive validity involves comparing the results of the research instrument obtained from a particular group of people to some event expected to occur within that population in the future (Brink, 1996:169). Predictive validity was used when the instrument was designed to categorise pregnant women with PIH according to age. Results obtained from this would enable the researcher to predict which age group is more likely to develop PIH in future.

Reliability refers to the consistency with which an instrument measures the attribute (Polit *et al*., 2001:305). According to Mouton, reliability concerns whether a particular technique, applied repeatedly to the same object, would yield the same result each time (Mouton et al., 2002:119). Reliability, however, does not ensure accuracy any more than precision does (Mouton et al., 2002:120).

The underlying issue is whether the process of the study is consistent, reasonably stable over time and across researchers (Burns *et al*., 2001:305). The instrument was administered by the researcher for consistency. The data collection tool was designed to collect all the required information from each patient's record.

3.7 ETHICAL CONSIDERATIONS

A detailed description of the ethical considerations implemented in this study is provided. The rights of patients were preserved as follows:

Anonymity was maintained throughout the research as information collected was not identified according to the patients' name; numbers were used instead, in case records needed to be re-examined. The numbers were arbitrarily assigned and were not patient reference numbers. The data and the patient files were kept at a safe location.

Confidentiality was maintained by not identifying the patients' records, which were handled by the researcher only during data collection.

The researcher maintained privacy during data collection by occupying a private room; no other person had access to the patients' records. The researcher locked the room when she had to go out. On completion of the data collection process the records were returned to the archieves.

Justice was observed by obtaining consent for assessing patients' records from the person in charge of the East London Hospital Complex, refer to annexure D3 and D4.
Permission was also obtained from the ethical committee of the University (committee for research on human subjects (medical)) for clearance of research involving human subjects, or patient records, from the postgraduate committee of the Faculty of Health Sciences of the University of Witwatersrand; the clearance number is 31.

Non-maleficence was ensured: no harm was done to either the patient's name or records. The complete and undamaged records were returned to the registry department for storage and safe keeping.

Beneficence: This implies doing good or in a given situation balancing benefits against harms. It involves positive action on one person's part to benefit another person (Fraser, Cooper & Nolte, 2006:52). The researcher was good at balancing the benefits of the research against the harm of lack of confidentiality. No person other than the researcher was exposed to the patient's records.

3.8 CONCLUSION

The research design used for this research was quantitative, descriptive and contextual. The research method took the form of a retrospective review of records with the use of a

data collection tool designed as a checklist. The population consisted of the records of all patients admitted with PIH to Frere Hospital in East London. Purposive sampling was done for patients who received midwifery care for PIH at level-I health care facilities. For simplicity, the data collection tool was divided into five sections, namely: A, B, C, D and E. The foci of these subsections were as follows:

Section A - Demographic data of the patient

Section B - History taking of a pregnant woman.

Section C - Ability of the midwife to diagnose PIH.

Section D - Management of the woman with PIH

Section E - Referral procedure from level 1- to either level-2 or -3 health care facilities.

Analysis of data was done with the help of a statistician and descriptive statistics were used. A pilot study was done before the actual research process. Validity and reliability was maintained and data collection was done by the researcher. Ethical principles of beneficence, non-maleficence, justice and rights were adhered to.

CHAPTER 4

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents a detailed discussion of the findings about the implementation of the National Guidelines for the Management of Pregnancy-Induced Hypertension by midwives at level-1 clinics in the Eastern Cape. The population used for this study consisted of all patients admitted with PIH to the East London hospital complex of the Frere Hospital from May 1999 to June 2001. The sample that was used consisted of records of all patients with PIH who were referred from level-1 clinics by the midwife to a tertiary hospital for further management by a doctor. The sample size comprised 291 records. The study was categorised as quantitative, descriptive and contextual. The research method used was a retrospective record review study of those patients who were referred by a midwife from a level-1 health facility to a level-3 health facility upon a diagnosis of PIH. Data collection was done by the researcher using a checklist to study the records of all patients referred by a midwife.

The research instrument, namely the above-mentioned checklist, was designed so as to address the aim and objectives of the study. The following documents were used to

develop a checklist of what is expected of the midwife when managing PIH and its complications at level 1:-

- Maternal Death Assessor Control form designed and used by the NCCEMD;
- SANC's regulations for midwifery practice R2488, R2598, R777 and R387 and the Nursing Act, No. 50 of 1978, as amended;
- Essential Drug List;
- The Guidelines for Maternal care in SA, a manual for clinics, community health centres and district hospitals;
- Saving Mothers second report on Confidential Enquiries into Maternal Deaths in SA 1999 -2001; and
- Midwifery textbooks.

The results for sections A to E are presented.

4.2 DEMOGRAPHICS OF THE PARTICIPANTS – SECTION A

The demographics of the participants in the study are described and include the following: the districts from which the patient came, age, whether referred or not and

transport. The patients referred from level-1 health centres to the tertiary health care hospital came from five (5) districts of the Eastern Cape. The districts have secondary hospitals which were unable to perform surgery due to non availability of an anaesthetist and lack of laboratory health services for further investigations.

4.2.1 Region / District

The Eastern Cape Province is divided into six (6) areas: five districts and one metropolitan area.

Each district has sub-local authorities who have control over health care facilities ranging from primary health care to tertiary health care facilities. Refer to Table 4.1 for the five districts of the Eastern Cape Province. The East London complex is in the Amatole district; hence the attendance was high for the period under review. Alfred Nzo, Chris Hani, O.R. Tambo and Ukhahlamba have one tertiary facility, the Umtata General Hospital, and an academic hospital, Nelson Mandela, to which patients from those districts were referred. Occasional patients attended tertiary hospitals in other districts when this was a patient preference.

Table 4.1: Districts that referred patients with PIH to the East London level-3 facility during May 1999 to June 2003

District	Frequency of patient referrals	Percentage (%)
Alfred Nzo	1	0.34
Amatole	270	92.78
Chris Hani	13	4.46
O.R.Tambo	1	0.34
U-Khahlamba	6	2.06
Total	291	100.00

4.2.2 Age

According to the English Oxford Dictionary, age is defined as the period of time that a person has lived, the period of existence. Table 4.2 displays the ages of pregnant women who attended antenatal care at level-1 clinics and were then referred to level-3 hospitals for further management of their PIH. The reproductive age, according to the South African National Maternal guidelines, is 15 to 49 years (DOH, 2001: 2). Figure 4.2 shows the frequency and percentage of the age distribution of women with PIH investigated in this study.

Table 4.2: Frequency of the age distribution.

Age	Frequency
14 – 19	32
20 – 24	65
25 – 29	85
30 – 34	69
35 – 39	30
40 – 44	9
45 – 49	1
Total	291

The youngest woman referred from a level-1 to a level-3 health care facility was 14 years old and the oldest was 46 (SD = 6.14). The mean age was 27.4. Women from 30 years and older constituted 37.45 % (n = 109) and those women younger than 30 years made up 62.54 % (n = 182). Teenagers, calculated from the age of 14 to 19 years, constituted 10.9 % (n = 32) of all women. In chapter two, teenage pregnancy was identified as one of the risk factors for PIH because of the age less than 18 years (Fraser & Cooper; 2003:257).

4.2.3 Referrals

According to the English Oxford Dictionary, 'to refer' means 'to hand over for consideration'. Referral of patients in this study was from a level-1 health care facility to a tertiary hospital in order to hand over the patient to the doctor for further management of her PIH. From the total of 291 reviewed records, referred cases constituted 83.16 % (n

= 242). The patients who referred themselves to the tertiary hospital made up 16.84 % (n = 49). The patients (n = 49) who referred themselves to the tertiary hospital had attended antenatal care at level 1, but the signs and symptoms of PIH were not identified by the midwife.

The women referred themselves to the tertiary hospital for the following reasons: no foetal movements were felt by the mother; onset of labour pains; epigastric pain; per vaginal bleeding; blurred vision or convulsions. The referred women were mainly from primary health care clinics, day hospitals or health care centres in the Amatole district, which has one hundred and sixty-nine (169) clinics in total.

Table 4.3 indicates the number of patients referred from level 1 to level 3 (Frere hospital). Only health care centres referring more than 10 patients were captured.

Table 4.3: Referred pregnant women from level 1 to the tertiary hospital for the period May 1999 to June 2003

Health Care Centre	Frequency	Percentage (%)
Braelyn	18	6.19
Central	23	7.9
Gompo	34	11.64
Pefferville	16	5.5
Total	91	31.23

It was noted that some women who were referred for raised blood pressure, proteinuria or having oedema and diagnosed as PIH did not have transport arranged for them at the level-1 health care facility. The researcher is of the opinion that women who were referred from the level-1 to the level-3 health care facility without having transport arranged for them, went back to their homes. The researcher thus suspects that the women who were not provided with transport from the level-1 to the level-3 health care facility, either experienced convulsions, per vaginal bleeding, intra-uterine death or felt no foetal movements in the night. However, the researcher needs to support this with evidence from a subsequent study.

Out of the total of 291 patients, 0.34 % (n = 1) presented at level 1 with a BP of 190/130 mmHg, oedema 2+ and proteinuria 2+. This patient was diagnosed with severe PIH and were listed for immediate referral to the tertiary hospital. When a patient preferred to go to the tertiary hospital the following day, the dangers of not going on the very same day were explained and this was documented in the patient's file. The patient was referred because she showed signs of severe PIH which needed further management by the doctor at the tertiary institution to prevent complications from occurring. Immediate referral of women with severe PIH is important to prevent organ dysfunction; abruption of the placenta; foetal death; coagulation dysfunction; and, most of all, death due to cerebral haemorrhage (DOH, 2007:82).

4.2.4 Transport

According to the recommendations of the NCCEMD, emergency transport should be available 24 hours a day for immediate referral of patients from home to a health facility and between institutions. The ambulances should be well equipped to allow for monitoring of the woman and foetus during transportation and to conduct delivery if necessary. A midwife or doctor or qualified paramedic should accompany the patient and monitoring should continue en route to the hospital (DOH, 2007:17).

The following subsection looks at the different types of transport used by patients when being transferred from a level-1 health facility to the tertiary hospital. The role of the midwife is to provide antenatal care to the pregnant woman and to refer her to the tertiary hospital when signs and symptoms of PIH are identified. Arranging transport when referring the patient to the tertiary hospital for further management by the doctor, to prevent maternal morbidity and mortality, is one of the functions of the midwife.

The researcher coded the transport used by the patient as follows:

- Private / own;
- Ambulance;
- Unknown; and
- Public.

The codes are explained further as follows:

1 – Private/own car signifies a woman who had her own transport from home to the health care centre or hospital.

2 – Ambulance in this study refers to vehicles owned by the government for free use by a pregnant woman. Patients were conveyed from either a level-1 health care centre or from home to the tertiary hospital for further management of PIH. All ambulances are supposed to have two health care providers, known as paramedics and trained to deal with an emergency and maternal care, either on the scene or en route to the hospital. As the paramedics were two to an ambulance, one drove the ambulance and the second one would be attending to the patient in the back of the ambulance.

3 – Unknown indicates that no type of transport was identified and no copy of the record usually left by ambulance attendants was available to identify how the woman came to the hospital, or whether she walked to the hospital.

4 – Public transport refers to either a taxi or a bus, hired or boarded by the woman from home, a taxi rank or a bus stop to the hospital. These, as public transport facilities, conveyed passengers from one point to the next with intermittent stoppages for passengers to alight at their destinations.

Table 4.4 illustrates the modes of transport used by patients, either from home or from the level-1 health care facility to the tertiary hospital.

Table 4.4: Transportation of patients from level-1 clinics to the tertiary hospital (frequency and percentage).

Transport	Frequency	Percentage (%)
Private	17	5.84
Ambulance	97	33.33
Unknown	162	55.67
Public	15	0.15
Total	291	100.00

According to the collected data, 5.15 % (n = 15) of patients with PIH hired public transport to the tertiary hospital; these patients were at risk because there were no paramedics or health care providers to provide care if complications arose along the way. Out of 242 referred patients, the mode of transport use to get to the tertiary hospital of 55.67 % (n = 162) of patients was not known and the practice of not arranging safe transport could have been detrimental to the patients as this category constituted more than 50 % of those referred. According to the policy and management guidelines reflecting common causes of maternal deaths, a patient should be transferred safely to the appropriate institution for further management (DOH, 2001:1). The National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) in SA included ten key recommendations after their first report. In the executive summary, recommendation

Number 3 clearly states that emergency transport facilities must be available for all pregnant women with complications at any level of health care facility (DOH, 2001:1).

4.3 HISTORY TAKING – SECTION B

4.3.1 Introduction

History taking is usually done by the midwife during the initial contact between the patient and the midwife at the level-1 health care facility. The importance of history taking lies in collecting all the data based on past and present experiences of the patient The contact enables the midwife and the patient to get to know each other and build rapport based on trust that can eventually develop into partnership. The activity of history taking forms part of antenatal care during pregnancy and focuses on information sharing and exchange.

4.3.2 History on antenatal care received at level - 1

As described by Fraser & Cooper (2003:251), antenatal care refers to care given to a pregnant woman from the confirmation of conception until the beginning of labour. History taking was done during antenatal care and recorded on the card known as the antenatal card. The antenatal card has a checklist and the following information is to be

obtained from the patient:

- Personal data;
- Menstrual history;
- General health;
- Obstetric history;
- Medical history;
- Family history;
- Social history;
- Allergies; and
- Physical examination involving the weight, blood pressure measurement, urine testing and blood tests in pregnancy.

To complete Section B of the data collection tool, the researcher required the above-mentioned information to have been collected by the midwife.

All patients were booked at various clinics in the Amatole district. A patient is considered to have received antenatal care if she has been seen in the antenatal clinic at least three times. In this study it was found that some of the patients were referred on the very first or second visit due to the raised BP or the presence of other signs and symptoms of PIH, like oedema or proteinuria. Booking of the women started at different stages of pregnancy, that is, the range of booking varied between 12/40 to 37/40 weeks. According to Fraser and Cooper (253: 2003) a booking visit is defined as the initial assessment of a

pregnant woman at the first visit (DOH, Eastern Cape, 4:2006). In one instance, the woman was booked at 37/40 weeks and two others were booked at 36/40 weeks.

The range of antenatal visits were from 1-11. The majority of patients visited the natenatal clinic at least 4 times. The blood pressure recorded at booking ranged from as low as 100/60 to as high as 300/180 mmHg. The majority of the women experienced a steady increase of systolic and diastolic BP during the course of their pregnancies. Unbooked women were not included in the study as they were not seen by the midwife at a level-1 health care facility.

4.3.2.1 Antenatal card

There were no antenatal cards for 15.12 % (n = 44) of the patients and 84.88 % (n = 247) of the patients had antenatal cards in their records. Those with no antenatal cards had the information that was required written in their records or referral letters. Some pregnant women were referred from different level-1 health care facilities out of the Amatole district but within the Eastern Cape Province.

The researcher assumed that the antenatal cards were left behind since referral letters contained the full information required for the study. Few antenatal cards had incomplete information, for example, the results of the measured BP and urine were not recorded. Some antenatal cards indicated the reasons for not supplying the results of the observations as the sphygmomanometer not working or multistix being out of stock.

4.3.2.2 Gravida

According to Fraser and Cooper (256: 2003) gravida is defined as a pregnant woman, and a number refers to the number of times the woman has been pregnant regardless of the outcome. Primigravidae constituted 45.36 % (n = 132) of patients with PIH, followed by gravida 2 who comprised 28.52 % (n = 83) of the patients. The smallest number was gravida 6 at only 0.34 % (n = 1) among the referred patients. According to the results of studies that were conducted at different places, it was discovered that primigravidae also revealed high percentages of patients who developed eclampsia, in Peshawar 69% and in Quetta 58% (Shaheen, et al. 2003: Online and Ashraf, 2004: Online).

Primigravida refers to a woman falling pregnant for the first time. Primigravidae are at risk of developing PIH because the incidence is more than twice as common in the first pregnancy as in multiparous women. The incidence is also higher in women over the age of 35 years or in elderly primigravidae where PIH could be superimposed over chronic hypertension. According to the second NCCEMD report for the triennium period (1999-2001:5), maternal deaths in primigravidae were found to have increased (Fraser, Cooper & Nolte, 2006:242; De Kock & Van der Walt, 2004:23-5). As primigravidae are at risk of developing PIH regardless of their maternal age or other contributory factors like nutrition, social habits or socio-economic background, proper history taking at the initial booking visit is of vital importance. The midwife should share the information that PIH

recurs and is a risk factor in multigravidae with new partners (Fraser, Cooper & Nolte, 2006:244).

4.3.2.3 Parity

Parity as defined by Fraser and Cooper (257:2003) refers to the number of times that the woman has given birth to a viable child, live or stillborn, but excluding abortions. Table 4.5 below displays the number of times the women whose records were studied had given birth to a viable child or children, live or stillborn.

Table 4.5: Description of parity, frequency and percentage

Parity	Frequency	Percentage
0	143	49.14
1	83	28.52
2	46	15.81
3	13	4.47
4	5	1.72
5	1	0.34
Total	291	100.00

Parity 0 had the highest incidence of developing pregnancy induced hypertension and exposure to the risk of having complications. The reason for primigravidae to be at a high risk of developing PIH and complications is due to a maternal immune response to foetal antigens derived from the father (paternal sperm) and is expressed in placental tissue. The prevalence decreases after long-term exposure to the paternal sperm (Fraser & Cooper, 358:2003).

4.3.2.4 Current pregnancy

From the total of 291 patients with PIH, multiple pregnancy occurred in 2.15 % (n = 8) of patients and a singleton occurred in 97.25 % (n = 283) of patients. Multiple pregnancy, which was a risk factor for PIH, led to 2.15 % whilst the singleton contributed to a high number of women with PIH, pre-eclampsia and eclampsia. A multiple pregnancy refers to the condition of two or more foetuses developing in the uterus at the same time (Sellers, 1993: 1143). In multiple pregnancy, the growing tissues in the uterus are greater than normal and there is hyperplacentosis, hence the development of pre-eclampsia and eclampsia (Beischer, Mackay & Colditz, 262:1997).

4.3.3 Presence of risk factors as indicated on the antenatal card

The discussion in this section focuses on the factors considered to indicate high risk to both the health of the mother and the foetus/es. Such factors are regarded as indicating high risk to the pregnant woman because they predispose the woman to the development of pre-eclampsia and for eclampsia. Proper history taking and screening of a pregnant woman are crucially important to prevent maternal morbidity and mortality and other complications that usually arise as a result PIH. The common risk factors that were identified are shown in Table 4.6.

Table 4.6: Frequency and percentage of common risk factors.

Risk factors	Frequency	Percentage (%)
Hypertension before pregnancy	12	4.12
Hypertension < 20 weeks pregnant	3	1.03
Hypertension in previous pregnancy with convulsions	14	4.81
Previous intra-uterine death due to hypertension	6	2.07
Diabetes mellitus	1	0.34
Cardiac disease	4	1.37
Elderly primigravidae	7	2.41
Total	35	12.03

Patients with hypertension before pregnancy were known hypertensives on medical treatment; the category was reported to be at risk of developing PIH. In the majority of cases, namely 83.84 % (n = 244) no risk factors were noted or recorded. The cause of PIH in those patients needed to be investigated. The records of patients without antenatal cards were reported earlier as making up 15.41 % (n = 44) out of 291. The information pertaining to the risk factors was missing and therefore could not be classified.

4.3.4 Health education given on signs and symptoms of PIH to be reported

The evidence showed that, out of the 291 patient sample, only 0.34% (n = 1) of patients were educated concerning the five danger signs to be reported as soon as they appeared. The information recorded on the antenatal card that was given to the patient by the midwife at level 1 was regarded as evidence. The rest were educated on routine health education topics which involved breast care, diet, clothing, minor disorders of pregnancy, rest, sleep, exercises and signs of labour. The researcher derived the information from the antenatal cards as it was recorded under health education given. According to the *Maternal guidelines in South Africa,* the information to be shared with the pregnant woman focuses on the five danger signs and symptoms to be reported to the midwife immediately they are noticed. As mentioned earlier on page 84.

4.4 DIAGNOSIS OF PIH AT LEVEL-1 CLINICS – SECTION C

In section C the researcher wished to determine whether the midwife at the level-1 clinic was able to make a diagnosis of PIH on the basis of the patient's presenting signs and symptoms.

4.4.1 Identification of signs and symptoms of PIH at level-1 clinics

From the total of 291 patients in the sample, 31.96 % (n = 93) had indications of protein during urine testing; 46.39 % (n = 135) of the patients developed oedema of the lower extremities and generalised body oedema was noted in some instances, with puffiness of the face. Proteinuria is defined as the presence of 2+ protein in the urine on two occasions, measured at least four hours apart, or 300 mg protein present in a 24-hour specimen of urine (De Kock & Van der Walt, 2004:20-3). Normally protein molecules do not pass through the membranes of the Bowman capsule due to the high molecular weight. The increased production of thromboxane, a vasoconstrictor causing hypertension, is shown in increased platelet aggregation and an increased permeability of capillaries which contribute to reduced plasma volume and to oedema.

The increased capillary permeability of kidney blood vessels allows protein molecules to pass through the capillaries during filtration and to be detected in urine during testing (De Kock & Van der Walt, 2004:20-4). A 24-hour urine collection for measuring total protein to provide an accurate quantitative assessment of protein loss is usually done. The findings are classified according to quantity of protein measured in urine. The amount of protein determined indicates the severity of the condition. If the findings show 300 mg in 24 hours or more, mild to moderate pre- eclampsia is indicated, and if more than 500 mg in 24 hours it is considered as severe pre-eclampsia (Fraser, Cooper & Nolte, 2006:341; Cronje & Grobbler, 2007:498).

Although it was observed that generalised oedema is common in pregnancy, it may become more than usual in PIH due to increased capillary permeability caused by endothelial cell alteration and reduced intravascular volume (Beischer, Mackay & Colditz, 1997:208). Oedema used to be regarded as one of the positive diagnostic criteria for PIH, but now it is only considered if other criteria like increased blood pressure or proteinuria are present. The generalised oedema that pits on pressure and is present in non-dependent areas like the face, lower abdomen, hands, vulva and sacral areas is caused by increased extracellular fluid due to damaged endothelial cells of the endothelium (Fraser, Cooper & Nolte, 2006:341).

Systolic blood pressure that is increased by 30 mmHg early in pregnancy, that is, at less than 20 weeks of pregnancy, occurred in 34.02 % (n = 99) of patients while an increase in diastolic blood pressure by 15 mmHg was also present in 34.02 % (n = 99). During pregnancy, the blood pressure of the woman is expected to fall due to the effect of prostacyclin, a vasodilator that dominates in normal placentation so as to allow more blood to flow to the intervillous spaces of spiral arteries of the decidua. The process occurs within the 16 to 20 weeks of gestation and results in maximal placental perfusion (Fraser, Cooper & Nolte, 2006:338; Cronje & Grobler, 2007:500). The abnormal placentation resulting from a maternal immune response to foetal antigens from the paternal side triggers the release of one of the factors that destroy the endothelial cells, the factor thromboxane, a vasoconstrictor which dominates the effect of the prostacyclin results in hypertension, abnormal coagulation, thrombosis and increased endothelial

permeability (Fraser, Cooper & Nolte, 2006:338; Cronje & Grobbler, 2007:500).

Elevated blood pressure of 140/90 mmHg on two or more occasions was present in 19.93 % (n = 58) of patients. Blood pressure was not checked in 1.37 % (n = 4) of patients due to faulty equipment as recorded on the antenatal card of the patient. In some instances it was neither recorded nor checked and the reason was not stated. It was observed that, although generalised oedema was common in normal pregnancy, in PIH it may occur more than usually due to increased capillary permeability caused by endothelial cell alteration and reduced intravascular volume (Beischer *et al*., 1997: 208). In the literature review it was stated that a systolic blood pressure increase of more than 30 mmHg above the patient's normal blood pressure indicates raised blood pressure. Again, in Chapter 2, mention was made of an increase of the diastolic blood pressure by 15 mmHg above the patient's normal blood pressure denotes an abnormality. A blood pressure reading of 140/90 mmHg or more on two occasions or more at least six hours apart indicate an abnormality during pregnancy (DOH, 2002:51). Based on the findings in the above paragraph, it is particularly true that a woman with such a blood pressure increase should be monitored very closely. Due to changes in the cardiovascular system during pregnancy, the blood pressure should be low and not increased (Nolte, 1998:290). According to the NCCEMD key recommendations, where it is clearly stated (in Number 5), equipment norms should be established per level of care and such norms must be adhered to at every health institution concerned with the care of pregnant women (DOH,

2002:1). It was observed that blood pressure of some pregnant women was never checked due to faulty equipment (baumanometer). Blood pressure was not checked in 1.37 % (n = 4) of patients due to faulty equipment, as recorded on the antenatal cards of the patients. In some instances it was neither recorded nor checked and the reason was not stated.

Basic Antenatal Care (BANC) of a pregnant woman requires checking of blood pressure at each antenatal visit (DOH, 2007:29; Snyder, 2002:30). It is important for the midwife to check the records of the previous visit at each visit so as to acquaint herself with the challenges identified and to assess whether challenges have been dealt with or whether alternate action is needed (Fraser, Cooper & Nolte, 2006:260). The midwife measures the blood pressure of the woman during the first visit so as to determine the baseline. During subsequent visits by the woman, the midwife should constantly check for a rise in systolic blood pressure of 30 mmHg and a diastolic rise of 15 mmHg as these indicate deviations from normal. One of the aims of antenatal care is for the midwife to recognise deviations from normal so as to prevent pregnancy from having a detrimental effect on maternal health. This aim can be achieved by thorough assessment of risk factors during pregnancy (De Kock & Van der Walt, 2004:9-2). Failure of the midwife to measure the blood pressure of a pregnant woman could lead to missed opportunities of identifying the development of abnormal blood pressure that could be detrimental to the life of the woman. Hypertensive diseases connected with pregnancy, for example, are classified as the second cause of maternal deaths, not only in SA but throughout the world (WHO,

2004:91). Therefore, if the blood pressure was not measured, the midwife should ask the pregnant woman the following questions:

- Are there bouts of severe headache?
- Is the vision disturbed? If yes, how is vision disturbed?
- Is there any difficulty in breathing?
- Are there any signs of vaginal bleeding?
- Is the foetus moving well? When was the last time the foetus moved? Or is there a reduction in movements?
- All the above questions need to be asked to exclude danger signs of pregnancy (Fraser, Cooper & Nolte, 2006:261).

4.4.2 Presence of secondary signs and symptoms of PIH at level-1 clinics

The presence of secondary signs and symptoms detected at level-1 clinics indicated the onset of pre-eclampsia. The observations in this regard are tabulated in Table 4.7, which shows the symptoms reported by patients and their frequencies and signs observed by the midwife.

Table 4.7: Symptoms reported by patients at level - 1 and their frequency and signs observed by the midwife

Sign and symptom	Frequency (N= 291)
(CNS) Severe headache	49
Restlessness	2
Hyperreflexia	3
Visual disturbance	5
Convulsions	5
Change in behaviour	2
Severe hypertension	14
(CVS) Oedema	150
Proteinuria	105
Haematuria	13
Upper abdominal pain	15
Poor foetal growth	1
Pulmonary oedema	1
Shortness of breath	4
Total	369

The total number indicated in the above table is 369 because some patients had identified

more than one sign and symptom of PIH, as well as complications developing at the same time. One patient, for example, would present oedema, proteinuria, severe hypertension, visual disturbance and severe headache. The implication would be for the patient to be counted under severe headache and again under severe hypertension, meaning twice or more.

The most common presenting symptoms were oedema (n =150) severe headache (n = 49) and upper abdominal pain (n=15). The most common presenting signs were proteinuria (n = 105), severe hypertension (n = 14) and haematuria (n =13).

4.5 MANAGEMENT OF PIH AT LEVEL-1 CLINICS – SECTION D

As indicated in the literature, patients presenting with PIH preferably should first be managed at a hospital or seen by the doctor to investigate the cause. Once discharged from the hospital and having the blood pressure under control, they should be followed up and cared for by the midwife at a level-1 clinic. A woman would report for routine antenatal care, not knowing that she had pre-eclampsia and needed to be managed at the level-1 health care facility before being transferred to a tertiary hospital for further management of the disease by the doctor. According to the guidelines for maternal care in South Africa presented in the manual for clinics, community health centres and district hospitals, management of patients with PIH depend on the severity of the signs and symptoms and observations made.

4.5.1 Management of mild to moderate PIH by the midwife at a level-1 clinic

Mild PIH, as defined in Chapter 2, is indicated by a BP reading of 140/90 mmHg or diastolic blood pressure of less than 100 mmHg, according to De Kock and Van der Walt (2004:20-7), with no proteinuria and oedema (DOH, 1998:76).

Out of the sample of 291, 35.74 % (n = 104) had increased blood pressure above 120/80 mmHg but below 160/110 mmHg, but did not have secondary signs and symptoms of PIH. The midwife in these instances acted according to the *Maternal guidelines for the management of PIH in SA,* in that the woman would be referred to a level-2 or -3 hospital on the same day (DOH, 2007:82) for further management. Patients who were started on antihypertensives – methyldopa 500 mg orally twice daily (DOH, 2007:84) at a level 1facility, according to the essential drug list and *Maternal guidelines for the management of PIH in SA,* numbered 1.03 % (n = 3) patients.

Of the patients who developed raised blood pressure, 1.37% (n = 4) were advised to rest and were reviewed within two to three days after the clinic visit; once again the *Maternal guidelines for the management of PIH* were adhered to. According to the literature it was important for the midwife to refer patients with blood pressure less than 160/110 mmHg, even in the absence of secondary signs and symptoms, for careful monitoring during pregnancy and obstetrician support (Fraser, Cooper & Nolte, 2003:259). Although non-

proteinuric PIH rarely contributes to significant maternal morbidity and the perinatal mortality rate, it is recommended that careful monitoring is still essential in case proteinuria develops later (Beischer *et al*., 1998:208).

4.5.1.1 Conclusion to the midwifery management of moderate PIH

The midwife has an option of not referring the woman to the hospital for a BP of less than 160/110 mmHg, but to advise such a woman to present herself for high-risk antenatal care weekly, for close monitoring. Such decisions would be influenced by the woman's home circumstances.

The midwife is supposed to inform the woman about monitoring foetal kick counts at home and to report abnormal patterns.

4.5.2 Management of severe PIH and imminent eclampsia by the midwife at a level-1 clinic.

Out of the total sample of 291, 28.52 % (n = 83) of pregnant women were referred to a tertiary hospital immediately due to the presence of the secondary signs and symptoms of PIH. Of these, 0.69 % (n = 2) of patients were admitted at level 1 and 2.75 % (n = 8) were given rapid acting drugs like nifedipine 10 mg orally at once, at level 1, to lower the raised blood pressure. Once again, the action taken by the midwife was found to be according to the *Maternal guidelines for the management of PIH in SA* (DOH, 2007:84).

In 2.06 % (n = 6) of the patients, the diastolic blood pressure was controlled to 90/100 mmHg before being transferred to a tertiary hospital. The main aim in the management of severe PIH and imminent eclampsia is to stabilise the condition before referral so that complications do not occur en route to hospital. The midwife carried out her duties as recommended by Woods *et al*. (2006:3-28).

Foetal distress was excluded in only 2.06 % (n = 6) of the patients before referral to the tertiary hospital by the midwife. The researcher has assumed that the Pinard stethoscope or doptone was used to monitor foetal condition as no electronic strips for foetal heart tracing were noted or attached to the antenatal card. The recommendation for foetal heart monitoring in such situations is the use of a CTG machine where a pattern of the foetal heart functioning can be seen and decisions made accordingly (DOH, 2007:82).

Renal dysfunction was present in 0.69 % (n = 2) of the patients. Renal dysfunction was regarded as the urine output of < 500ml in 24 hours and the rapid rise of serum urea and creatinine levels. Serum creatinine and urea levels were the investigations done at level 3 to assess organ dysfunction (Cronje &Grobler, 2007:503).

Gestational age had been assessed in 7.22 % (n = 21) of cases. In the event that the gestational age was between 27 and 34 weeks, steroids were given to enhance foetal lung maturity. Steroids were administered to 0.69 % (n = 2) of the patients. Opinion regarding

transfer was sought from the referring hospital and actions were carried out as recommended. It was crucial that management of severe pre-eclampsia to prevent complications and morbidity be done at the level-1 health facility, as not only the woman's life was as at stake, but of the foetus as well.

Blood pressure was controlled to prevent cerebral haemorrhage and placental abruption, which would have led to maternal and foetal death (Beischer *et al*., 1998:212; Fraser *et al*., 2003:363; Nolte, 1998:298).

4.5.2.1 Conclusion to midwifery management of severe PIH and imminent eclampsia

- Good management of lowering or stabilising BP was noted, with concern in some areas;
- Poor recording by midwives was observed;

The following recommendations of the NCCEMD were not implemented:

- Urinary output was not recorded hourly and to be tested for abnormalities;
- Blood pressure was not measured hourly to evaluate effectiveness of administered medication; and
- Indwelling urinary catheter was not inserted so as to help with the hourly measurement of urinary output.

4.5.3 Management of eclampsia by the midwife at level-1 clinics

Of the 291 patients making up the total population, 1.72 % (n = 5) developed eclampsia at level 1. In accordance with the expected midwifery care of women with eclampsia as stipulated in *Maternal guidelines for the management of PIH in SA* (DOH, 2007:84) the following was done:

- One of the five patients was turned to the left lateral position to promote good oxygenation to the foetus and to prevent supine hypotensive syndrome;
- Two of the five patients had their airways cleared, after which insertion of the oropharyngeal airway was done to facilitate air entry to the lungs;
- Ringers lactate solution was given intravenously to all five patients; the amount administered and over how many minutes it was run was not stipulated;
- Blood pressure was monitored quarter-hourly in all five patients until stabilised between 90/100 mmHg before transferring the patient to the tertiary hospital;
- Magnesium sulphate was administered as loading and maintenance doses to one of the five patients and was continued during the transfer to a tertiary hospital;
- Foley's indwelling catheter was inserted in one of the five patients to monitor urinary output hourly.

Monitoring the urinary output and urinalysis 4-hourly for ketones, glucose and protein are important for detecting the extent of renal damage. The presence of protein indicated

reduced kidney perfusion, reduced creatinine clearance, increased serum uric acid and creatinine. The output of 30 ml/hour reflected adequate renal function, but any output below 30ml/hr should have been reported to the doctor immediately (Fraser & Cooper, 2003:363; Nolte, 1998:299).

4.5.3.1 Conclusion to the management of eclampsia

The following recommended actions were omitted:

- Oxygen was not administered to the woman though convulsions led to poor placental perfusion;
- No cot sides or other precautionary measures were taken by midwives to prevent injuries to the woman;
- No monitoring was recorded of fluid given to the mother so as to prevent pulmonary oedema and fluid overload;
- No recording of precautionary measures that were supposed to be taken before MgSo4 was administered. The precautionary measures are required to prevent the detrimental effects of the drug to the woman.

The researcher noted that all the recommendations in *Maternal guidelines for the management of PIH* were not followed by the midwife at the level-1 clinic.

4.6 PRESENCE OF THE REFERRING CRITERIA OF PIH AT LEVEL-1 CLINICS – SECTION E

Complications that developed at level 1 which compelled the midwife to refer the patient are shown in Table 4.8. The total number of complications recorded was 293, as some patients developed more than one complications.

Table: 4.8 Complications of PIH at level-1 clinics

Criteria	Frequency	Percentage (%)
Antepartum haemorrhage	7	2.41
Abnormal liver function test	126	43.30
Coagulation deficiency	23	7.90
Lung oedema	5	1.72
Renal dysfunction	121	41.58
Prematurity	11	3.78
Total	293	100.00

Antepartum haemorrhage is a complication that occurs as a result of placental abruption,

which is premature separation of a normally situated placenta occurring after 22 weeks of pregnancy (Fraser & Cooper, 2003:302). Placental abruption occurs as a result of sudden reduction in the size of the uterus, as in the case of the preterm prelabour rupture of membranes.

Abnormal liver function tests resulting from sub capsular hepatic syndrome are due to reduced hepatic flow and hepatic haemorrhage because of the swelling of the liver.

Coagulation deficiency results from damage to tissues at the placental site, causing large quantities of thromboplastin to be released into the circulation due to break-down in platelets (Fraser & Cooper, 2003:30

Lung or pulmonary oedema is caused by oedema within the intracellular space, resulting from capillary permeability due to damaged endothelial cells.

Renal dysfunction results from decreased renal blood flow producing hypoxia and oedema of the endothelial cells of the glomerular capillaries. Damage of the glomerular endothelium allows plasma protein to filter into the urine, producing proteinuria. Oliguria develops as the condition worsens, due to kidney damage. Renal damage is reflected by increased serum creatinine, uric acid levels and reduced creatinine clearance.

Prematurity is caused by placental abruption leading to placental insufficiency and

hypoxia, so that, to save the foetus, birth has to take place whether by induction or caesarean section.

The majority of the investigations undertaken to assess the extent of the dysfunction of organs were done at the tertiary hospital, on admission. This finding was not unexpected, as further investigation of a patient with PIH and eclampsia should ideally be done at the tertiary level as opposed to the primary level. However, blood investigation of patients with PIH and eclampsia was done at a few of the level-1 clinics. The researcher assumed that, if the investigations undertaken on arrival of the patient at a tertiary hospital revealed abnormalities, the abnormalities would have been present at the level-1 facility, but there was no laboratory service to investigate the patient.

4.7 CONCLUSION

Although the Eastern Cape has six districts and one metropolitan area, patients from five districts only were referred to the East London Frere Hospital, a tertiary institution. The age of patients ranged from as young as 14 to as old as 46 years, and parity was from 0 to 5. Primigravidae constituted the majority of pregnant women. There were women who referred themselves to the tertiary hospital whose signs and symptoms of PIH were identified at level 3 while missed by the midwife at level 1. The reasons for their self-referral were revealed through complaints such as the following:

- No foetal movements felt;
- Labour pains;
- Vaginal bleeding;
- Epigastric pain;
- Blurred vision; and
- Convulsions.

Booking of pregnant women started from as early as the 12th week and ranged to as late as the 37th week of pregnancy. During history taking, the following risk factors that occurred with previous pregnancies were identified:

- Intra-uterine death;
- Diabetes mellitus;
- Hypertension with convulsions;
- Hypertension before pregnancy;
- Hypertension developing in less than 20 weeks of pregnancy;
- Cardiac problems; and
- Elderly primigravida.

Eight (2.15 %) of the pregnancies were multiple pregnancies and 97.25 % (n = 283) were singletons. Pregnancy-induced hypertension as a risk factor occurred more in singleton pregnancies versus multiple pregnancies.

During observations, BP as low as 100/60 mmHg to as high as 300/180 mmHg were measured, and proteinuria 4+ and oedema 3+ were noted. In some instances the BP was not measured due to a faulty baumanometer and urine was not tested to exclude the presence of protein due to multistix being out of stock. This was a risk, as abnormalities could not be detected.

Health education given by the midwives was not specific with regard to the danger signs of pregnancy; only one patient had recorded evidence indicating that she was informed about the danger signs of pregnancy. The remaining 99.66 % (n = 290) of patients had recorded evidence of being educated concerning minor disorders of pregnancy and routine issues like clothing, diet, etc.

Regarding the management of PIH by the midwife at level 1, the *Maternal guidelines for the management of PIH in SA*, were not well followed or implemented, as:

- The patients with a blood pressure increase of more than 30 mmHg systolic and 15 mmHg diastolic after 20 weeks of pregnancy were not noted and followed up.
- Urine in patients whose blood pressure had increased from the normal after 20 weeks were not tested to exclude the presence of protein in their urine.
- No transport was arranged to ensure the safety of the referred patients who had increased blood pressure.

The complications that compelled midwives to refer to level 3 included:

- Antepartum haemorrhage;
- Coagulation deficiency;
- Prematurity;
- Lung oedema; and
- Abnormal liver function.

Poor recording was noted with concern, as this revealed the quality of midwifery care rendered to the pregnant women.

Transport was noted to be a challenge when women had to be referred to a higher level of care for further management.

The conclusion summing up the whole chapter's findings, together with recommendations for practice and further research discussed in detail in Chapter 5.

CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

The conclusions arrived at according to the findings of analysed data, and recommendations for future practice and midwifery research are presented in this chapter.

5.2 CONCLUSION

5.2.1 Region / District

The Eastern Cape Province is composed of six districts and one Metropole. Five of the six districts referred patients to Frere Hospital, the Amatole district tertiary hospital at, the East London complex. Alfred Nzo, the Amatole clinics and the secondary hospitals, namely O.R. Tambo, U-Khahlamba and Chris Hani, also referred patients to the tertiary hospital in the Amatole district, although the numbers were very small: out of the total population of 291 in the study, only 7.56 % (n = 22) patients were received. The reason for the referral for further management of PIH was that some of the regional and district hospitals did not have anaesthetists for a caesarean section to be performed and had no

laboratory services for investigations to assess the extent to which organs like kidneys, liver and blood tissue had been affected.

5.2.2 Age

The ages of pregnant women ranged from 14 to 46 years. As the child bearing age in South Africa is regarded as from 15 to 49 years, age did not present a challenge.

Out of the sample of 291, only one (0.34 %) pregnant woman was 14 years old and a primigravida below the reproductive age, which, according to the *National Maternal Guidelines in SA,* start at 15 years of age. Early reproductive age is a risk factor for PIH.

5.2.3 Referrals

Referral of pregnant women in this study involves sending women from a level-1 facility to a tertiary hospital for further management of PIH by the doctor. The research has indicated that the referral system to be followed was not well understood by the midwives, more especially those working in clinics around the Amatole district, as patients were left to fend for themselves with regard to how to get to the tertiary hospital when referred. On two occasions, patients with a blood pressure of 140/90 mmHg, whose diastolic pressure continued to rise (by 15 mmHg) from baseline diastolic blood pressure

were either not considered as no action was taken by the midwife. Of the participants in the study, made up from the 291 patients records that were reviewed, 83.16 % (n = 242) were referred to tertiary hospital by the midwife. The remaining pregnant women comprising 16.84 % (n = 49) referred themselves to a tertiary hospital due to a reduction in foetal movements, blurred vision, labour pains, epigastric pain, convulsions or per vaginal bleeding. The latter category was missed by the midwife at level 1, as signs and symptoms of PIH were only noted on admission at the tertiary facility. The referred women were mainly from different clinics, day hospitals and health care centres in the Amatole district, which has one hundred and sixty nine (169) clinics in total.

5.2.4 Transport

Transport used for conveying patients to the tertiary hospital was not safe as no health care provider was available during transportation. In the case of 66.66 % (n = 194) of the patients, the mode of transport was either not known, or private or public. Maternal patients are supposed to be transported by ambulance when referred to a tertiary hospital and to b accompanied by a midwife, doctor or skilled paramedic for the monitoring of blood pressure and foetal condition on the way to hospital, to prevent complications like eclampsia and permanent kidney damage.

5.2.5 Antenatal care and antenatal card

The records revealed that patients were booking in at various times during their pregnancies and some were prompted by the onset of signs and symptoms of PIH. Antenatal cards were not presented for 15.12 % (n = 44) of the patients, which could be attributed to the loose documents that were used or to being left behind in referring health care centres. The time recommended for booking was as soon as the woman realised that she was pregnant, as early antenatal booking is important for the woman who has hypertension or experienced complications related to PIH in a previous pregnancy, or has used an IUD. Antenatal booking should start as soon as a woman realises that she is pregnant, at the least at three months (Nolte, 1998:77; Fraser *et al*., 2003:254). All the patients whose records were investigated for the study had booked at a level-1 clinic; no patients booked at the tertiary hospital.

5.2.6 Gravida

Out of the total sample of 291, 45.36 % (n = 132) patients were primigravidae and 5.30 % (n = 7) of those who had fallen pregnant for the first time were older than 35 years. Primigravidae, more especially elderly primigravidae, are at an increased risk of developing PIH, as explained in Chapter 4.

5.2.7 Current pregnancy

Singleton pregnancies occurred in 97.25 % (n = 283) of the women who developed PIH, pre-eclampsia and, in few cases, eclampsia, while pregnant women with a multiple pregnancy are at an increased risk of developing PIH, refer to precipitating and risk factors on page 50.

5.2.8 Presence of risk factors as indicated on the antenatal card

Risk factors were identified in some patients who developed PIH. One potential risk factor was HIV; 24.05 % (n = 70) of the pregnant women who developed PIH were also diagnosed as being HIV positive. HIV/AIDS could have had some effect on the blood pressures of the pregnant women, but the pathophysiology of the disease needs further investigation and understanding. (Fraser, Cooper & Noite, 2006:339)

5.2.9 Health education given on signs and symptoms to be reported

When she attends the antenatal care facility, a pregnant woman is given health education according to identified need/s and education on the danger signs and symptoms of PIH to be reported are supposed to be given to prevent maternal mortality and morbidity due to this condition. The signs and symptoms that are dangerous with regard to pregnancy are

explained in Chapter 2. The records on health education, however, did not reveal that these signs and symptoms were shared with women, except in one case (0.34 %). For most of the pregnant women, there was no record indicating that they had been made aware of the danger signs and symptoms of PIH that had to be reported immediately when they occurred or that they had been warned not to wait for the next appointment date to make mention of it.

5.2.10 Identification of secondary signs and symptoms of PIH at level-1 clinics

There was poor identification and diagnosis of PIH: 16.80 % (n = 49) of the patients had been overlooked by the midwife at the level-1 clinic.

5.2.11 Management of mild, moderate and severe PIH, imminent eclampsia and eclampsia

Management of patients who developed pre-eclampsia and eclampsia was poorly done by the midwife as there were hardly any records concerning measurement of BP and testing of urinary output, except for 0.69% (n = 2) of the patients and only 0.34 % (n = 1) had had an indwelling catheter inserted.

Monitoring of foetal growth by means of symphysis fundus height (SFH) measurement was not done, as this was noted for only 0.34 % (n = 1) of the patients. Foetal distress was excluded in 2.06 % (n = 6) of the patients out of the 291 patients seen at level 1; this action did not reflect safe midwifery practice as 97.93 % (n = 285) of the patients were not assessed for foetal wellbeing. Foetal distress was to be excluded by listening to the foetal heart rate using either the foetoscope, doptone or CTG and monitoring the foetal movements by asking the mother about foetal activity.

5.3 RECOMMENDATIONS

5.3.1 Introduction

The researcher identified various gaps in the midwifery care and management of the pregnant woman with PIH at level 1. The gaps identified were classified as avoidable, as opportunities to recognise the signs and symptoms of PIH at level 1 were missed by the midwife and substandard care was provided. The researcher could not understand why there was a problem with arranging transport for referred pregnant women to the next level of care no reason for it was recorded anywhere on the patients' antenatal cards.

Pregnancy-induced hypertension is the second cause of maternal death in South Africa, as in other countries, and it is therefore imperative for the midwife to be able to manage the pregnant woman with PIH. The recommendations for effective management and care of a pregnant woman with PIH at level-1 facilities will be discussed in the following paragraphs.

- **Refer the patient with PIH on the same day the diagnosis is made**

It is recommended that midwives at level-1 clinics should not only consider increased blood pressure, that is, the systolic and diastolic blood pressure, only, but should also consider the normal blood pressure of the individual woman, if known, and look for the 30 mmHg increase in the systolic blood pressure and the 15 mmHg increase of the diastolic blood pressure (De Kock & Van der Walt, 2004:20-30).

A woman with PIH should be referred to hospital and transported from level 1 on the same day (DOH, 2007:81). The midwife is responsible for arranging transport to the referral hospital and for handing over the patient to the doctor and the referral hospital telephonically. In the case of severe PIH, imminent eclampsia and eclampsia, the receiving hospital should be informed so that they can prepare to receive the patient (DOH, 2007:81).

- **Provide health education and list the danger signs on the antenatal card**

Education should be given to encourage women to start attending antenatal clinics early when pregnant to obtain a baseline blood pressure, at the latest at three months, to monitor both maternal and foetal conditions and to diagnose abnormalities before complications become life-threatening emergencies (WHO, 1998: 21)

If the clinic is accessible patients are more likely to attend early and prevent complications (WHO, 1998:63).

Women should be encouraged to attend antenatal care clinics regularly; it was noted that the return dates were ignored by the patients in some cases. One of the independent functions of the midwife is to provide information to pregnant women (DOH, 2007:19). According to safe motherhood practices, antenatal care sessions should be used as an opportunity to provide information to women and their families about danger signs and symptoms. Provision of the information should help them to plan the delivery on the basis of the woman's history and the status of her health (WHO, 1998:22).

- **Ensure all documents are present when referring patients with PIH**

When referred, the antenatal cards of the pregnant women should be included in the documents that are sent with the patient to the tertiary hospital and not be left behind in the folder, as valuable information can be obtained from it. Every pregnant woman presenting at a health care facility should be given an antenatal card. The antenatal card is the principal record of the pregnancy and must be completed by the midwife on each and every visit. The woman should keep the antenatal card and present it whenever she presents herself at a health facility until delivery, after which it will be kept at the place of birth (DOH, 2007:19). On admission to antenatal care, a proper history of the woman should be recorded as most of the gaps on the cards were noted in connection with incomplete histories. Full and proper history taking refers to the current pregnancy, allergies, familial and genetic disorders, present medical history, use of medication, alcohol and other substances, family and social circumstances, present and past obstetric history, surgical, social, gynaecological and general history recording necessary personal data (DOH, 2007:20; Fraser & Cooper, 2003:360).

- **Prevent advanced maternal age and early primigravida through effective contraception**

Women who have completed their families should be encouraged to be sterilised or to use an effective means of contraception to avoid unwanted pregnancies and related

complications. The midwife must ensure access to information on contraception; provision of service is the key element of the Mother-Baby Package (WHO, 1998:19). Although any pregnancy carries some risk of maternal death or morbidity, some are more risky than others, for example, very young women, women of high parity and older women. Contraception also helps to prevent unwanted pregnancies as these are a threat to the woman's health because she may resort to unsafe abortion with all its risks (WHO, 1998:19). There are several strategies that can be used by the midwife, which include health education of adolescent boys and girls on issues related to reproduction, human sexuality and the inadvisability of early marriage and pregnancy (WHO, 1998:20). Contraception is one of the five pillars of safe motherhood in South Africa which is provided to ensure that individuals and couples have the necessary information so as to plan the timing, number and spacing of their pregnancies (DOH, 2007: 8).

Women who had severe PIH when pregnant should be encouraged to start antenatal care as soon as they suspect that they are pregnant again. Proper health education should be given regarding PIH in future pregnancies; the partner should be involved as well (Fraser *et al.*, 2003:257).

- **Provide enough staff for the level-1 clinics**

There should be adequate staffing, determined according to the staff establishment of the particular facility. Advanced midwives, midwives, enrolled nurses, nursing assistants, a community health worker and a visiting or resident medical officer should be available (DOH, 2007:13).

Midwives should educate each and every pregnant woman about the danger signs and symptoms which could indicate the onset of PIH and should to be observed and reported; to save time, such teaching could be done in a group rather than on individual basis. The researcher assumed that one of the contributory factors to not providing health education may have been due to staff shortages. Staff shortage should not compromise the quality of care that the pregnant woman should receive.

- **Train midwives on the management of PIH at level 1**

According to Snyder (2002:49), a midwife is defined as a skilled attendant who has been trained to be proficient in the skills necessary to manage normal deliveries and diagnose and refer complications. Ideally, the skilled attendant should be a person who lives in and is part of the community that is served. Midwives should be able to manage normal labour and delivery, identify the onset of complications, perform essential interventions,

start treatment and supervise the referral of both mother and baby for interventions that are beyond their competence or not possible in the particular situation. The skilled attendants should work in collaboration with traditional birth attendants for deeper penetration into the communities (Cronje & Grobbler, 2006:679). A programme for the continuing education of staff is essential; in the Western Province, the following are provided:

- Orientation courses for new personnel on the guidelines for PIH;
- Perinatal mortality and morbidity meetings held at least once a month where PIH as a cause of death is specifically discussed;
- Feedback on patients referred to hospital to reveal whether the referral was appropriate or not in cases where the patient has been identified as a being at high risk for developing PIH and the need to attend a high risk antenatal care at a level 3 institution;
- Case discussions in which patients in the antenatal clinic, labour and postnatal wards are included to empower them on foetal movement monitoring or kick counts at home and what other danger signs to look for. A patient in labour has a partogram to be scrutinised for any rise in blood pressure or presence of protein in urine.
- Refresher courses which should focus on routine procedures and advanced techniques; and

- Outreach programmes for promoting team spirit and support to implement the *National Guidelines for Maternity care*.

Midwives should be technically competent and this competence depends on regular training and retraining and being able to access and implement guidelines for clinical treatment in order to provide quality care. The person with midwifery skills should be the key provider for the implementation of interventions (WHO, 1998:59). In order to develop and manage human resources, the specific skills to improve maternal health care will depend on national and local needs. The managers and direct care providers should be appropriately trained and supported by the clinical skills and supervisory capabilities of staff. The upgrading of midwifery skills should be treated as a priority where assessment of the needs for training and retraining of maternal health care managers and providers are done (WHO, 1998:58). Midwives should take responsibility for the full range of women's reproductive health needs, including the management of life-threatening conditions (WHO, 1998:15).

- **Magnesium sulphate protocol**

The midwife should familiarise herself with the loading and maintenance doses of $MgSO_4$ to be used whilst awaiting referral as well as the safe administration of fast acting drugs for lowering BP (DOH, 2007:86).

- **Foetal condition**

Assessment of the gestational age and foetal condition should be done at level 1, irrespective of whether the patient is being referred or not, as that is the recommendation and is in line with the regulations governing the actions of the registered midwife (Cronje & Grobbler 2006:507), and as stipulated in R2488 and R2598.

- **Observations**

A specimen of urine should be tested for proteinuria at each and every visit and results must be recorded; the same applies to the measurement of the blood pressure to identify and manage hypertension (Snyder, 2002:30).

- **Equipment**

The resuscitation equipment should be checked at regular intervals so as to ensure that it is in working order and, if faulty, should be sent for repairs. Ordering of stock needs to be done on time. A monthly inventory of available stock should be done and a record kept. The minimum package of care for a pregnant woman can only be fulfilled if all the investigations and observations are done as recommended at each and every visit to the antenatal care clinic. There should be functioning blood pressure apparatus and cuffs of

different sizes, stethoscopes and urine dipsticks for urine testing (DOH, 2007:169; Fraser, Cooper & Nolte, 2006:247; WHO, 1998:61).

- **Records**

Records should be completed and kept safe as that is the SANC requirement and no document should be missing in case the record is required for either an investigation or a hearing. There should be a record auditing committee appointed to ensure that the quality of care given to pregnant women is of high standard (DOH, 2007:19). In-service education for midwives should be planned and conducted with particular reference to PIH whenever there are new updates and developments. The Provincial and District Mother, Child and Women's Health (MCWH) services should make it a point that the reports and recommendations made by the NCCEMD after each triennial report are made available to all level-1 clinics for implementation. The supervisors of the level-1 clinics should monitor the implementation of the *National Guidelines for Maternal Care* whenever the midwife is managing pregnant women (WHO, 1998:65).

- **Continuing education**

The level-1 clinics should be staffed adequately so that the midwives can attend workshops, midwifery congresses and seminars to keep them up to date with the latest

developments (Cronje & Grobbler, 2006:679; Snyder, 2002:28). The researcher also noted that the terms which are used are the old terms that are not used anymore, like intra-uterine growth retardation instead of intra-uterine growth restriction (Cronje & Grobbler, 2006:739).

5.4 LIMITATIONS OF THE STUDY

The following were identified as the limitations of this study:

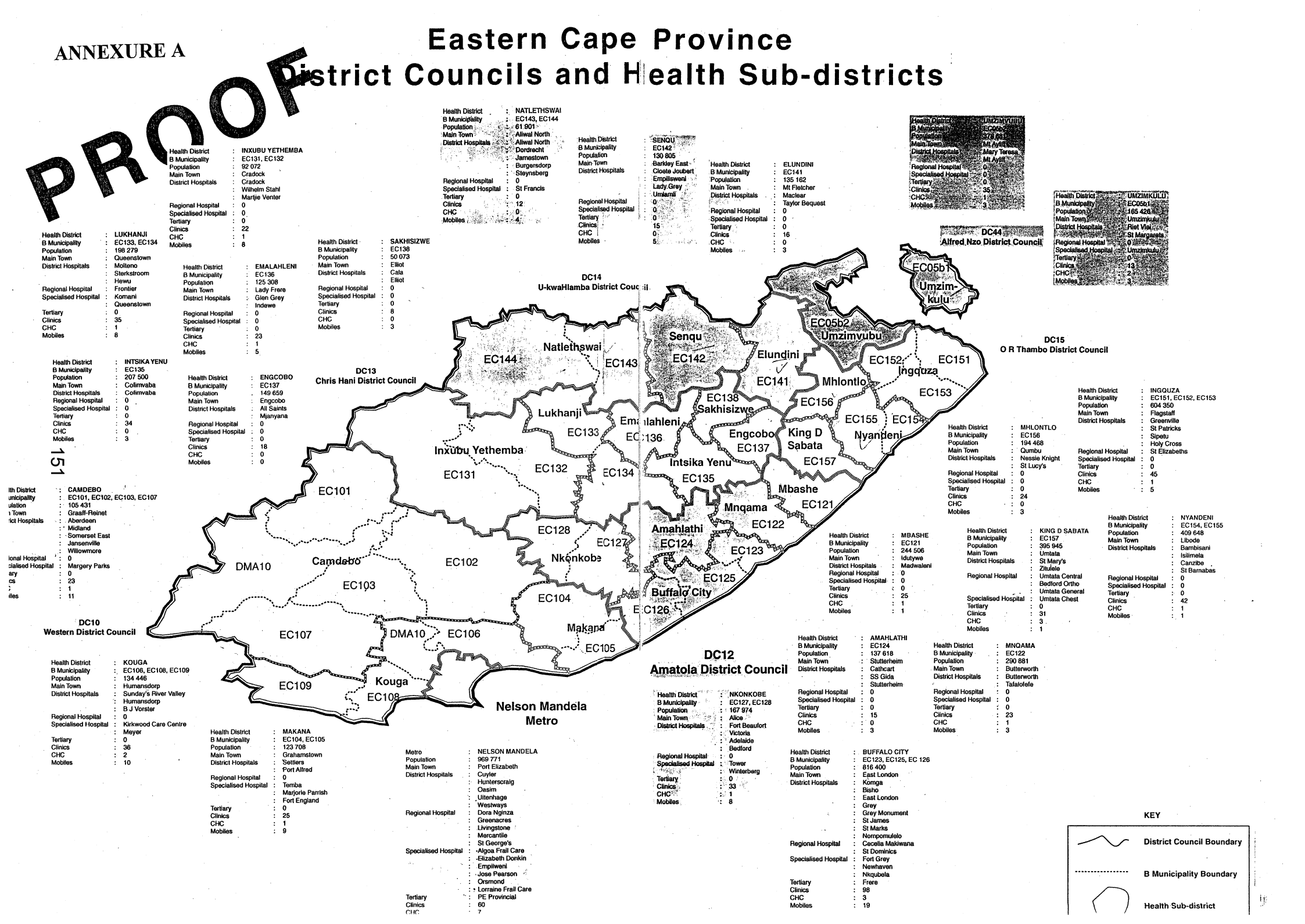
- The records of patients had incomplete notes, which made data analysis difficult as information was missing.
- Unbooked patients who presented themselves at the tertiary hospital could not be included in the study as they were not seen by the midwife at a level-1 health care facility and did not have antenatal cards.
- Patients who referred themselves to the tertiary hospital did not have the necessary documentation from the clinic and safe transport services for both maternal and foetal conditions could not be included in the study either.
- Patients who died at level 1 prior to referral or during the referral process were not included in the study;
- Patients who died at home were not included in the study;
- Patients who developed post partum PIH were not included in the study; and
- Some patients may have had transport arranged but did not use this transport.

5.5 CONCLUSION

The researcher has described the extent to which the national guidelines were implemented at level 1 in the management of the woman with PIH. Given the findings of study, the researcher has made recommendations with the intention of reducing mortality due to PIH in the Eastern Cape. These recommendations will be distributed to the Department of Health, Maternal Child and Women's Health Director, Lilitha College of Nursing and District Health Services.

ANNEXURE A

Eastern Cape Province
District Councils and Health Sub-districts



Health District : NATLETHSWAI
B Municipality : EC143, EC144
Population : 61 901
Main Town : Aliwal North
District Hospitals : Aliwal North
: Dordrecht
: Jamestown
: Burgersdorp
: Steynsberg
Regional Hospital : 0
Specialised Hospital : St Francis
Tertiary : 0
Clinics : 12
CHC : 0
Mobiles : 4

Health District : SENQU
B Municipality : EC142
Population : 130 805
Main Town : Barkley East
District Hospitals : Cloete Joubert
: Empilisweni
: Lady Grey
: Umlamli
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 15
CHC : 0
Mobiles : 5

Health District : ELUNDINI
B Municipality : EC141
Population : 135 162
Main Town : Mt Fletcher
District Hospitals : Maclear
: Taylor Bequest
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 16
CHC : 0
Mobiles : 3

Health District : UMZIMVUBU
B Municipality : EC05b2
Population : 278 845
Main Town : Mt Ayliff
District Hospitals : Mary Teresa
: Mt Ayliff
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 35
CHC : 1
Mobiles : 3

Health District : UMZIMKULU
B Municipality : EC05b1
Population : 165 426
Main Town : Umzimkulu
District Hospitals : Riet Vlei
: St Margarets
Regional Hospital : 0
Specialised Hospital : Umzimkulu
Tertiary : 0
Clinics : 13
CHC : 2
Mobiles : 3

Health District : INXUBU YETHEMBA
B Municipality : EC131, EC132
Population : 92 072
Main Town : Cradock
District Hospitals : Cradock
: Wilhelm Stahl
: Martjie Venter
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 22
CHC : 1
Mobiles : 8

Health District : LUKHANJI
B Municipality : EC133, EC134
Population : 198 279
Main Town : Queenstown
District Hospitals : Molteno
: Sterkstroom
: Hewu
Regional Hospital : Frontier
Specialised Hospital : Komani
: Queenstown
Tertiary : 0
Clinics : 35
CHC : 1
Mobiles : 8

Health District : EMALAHLENI
B Municipality : EC136
Population : 125 308
Main Town : Lady Frere
District Hospitals : Glen Grey
: Indewe
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 23
CHC : 1
Mobiles : 5

Health District : SAKHISIZWE
B Municipality : EC138
Population : 50 073
Main Town : Elliot
District Hospitals : Cala
: Elliot
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 8
CHC : 0
Mobiles : 3

Health District : INTSIKA YENU
B Municipality : EC135
Population : 207 500
Main Town : Cofimvaba
District Hospitals : Cofimvaba
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 34
CHC : 0
Mobiles : 3

Health District : ENGCOBO
B Municipality : EC137
Population : 149 659
Main Town : Engcobo
District Hospitals : All Saints
: Mjanyana
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 18
CHC : 0
Mobiles : 0

Health District : MHLONTLO
B Municipality : EC156
Population : 194 468
Main Town : Qumbu
District Hospitals : Nessie Knight
: St Lucy's
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 24
CHC : 0
Mobiles : 3

Health District : INGQUZA
B Municipality : EC151, EC152, EC153
Population : 604 350
Main Town : Flagstaff
District Hospitals : Greenville
: St Patricks
: Sipetu
: Holy Cross
Regional Hospital : St Elizabeths
Specialised Hospital : 0
Tertiary : 0
Clinics : 45
CHC : 1
Mobiles : 5

Health District : NYANDENI
B Municipality : EC154, EC155
Population : 409 648
Main Town : Libode
District Hospitals : Bambisani
: Isilimela
: Canzibe
: St Barnabas
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 42
CHC : 1
Mobiles : 1

Health District : MBASHE
B Municipality : EC121
Population : 244 506
Main Town : Idutywe
District Hospitals : Madwaleni
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 25
CHC : 1
Mobiles : 1

Health District : KING D SABATA
B Municipality : EC157
Population : 395 945
Main Town : Umtata
District Hospitals : St Mary's
: Zitulele
Regional Hospital : Umtata Central
: Bedford Ortho
: Umtata General
Specialised Hospital : Umtata Chest
Tertiary : 0
Clinics : 31
CHC : 3
Mobiles : 1

Health District : MNQAMA
B Municipality : EC122
Population : 290 881
Main Town : Butterworth
District Hospitals : Butterworth
: Tafalofefe
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 23
CHC : 1
Mobiles : 3

Health District : AMAHLATHI
B Municipality : EC124
Population : 137 618
Main Town : Stutterheim
District Hospitals : Cathcart
: SS Gida
: Stutterheim
Regional Hospital : 0
Specialised Hospital : 0
Tertiary : 0
Clinics : 15
CHC : 0
Mobiles : 3

Health District : NKONKOBE
B Municipality : EC127, EC128
Population : 167 974
Main Town : Alice
District Hospitals : Fort Beaufort
: Victoria
: Adelaide
: Bedford
Regional Hospital : 0
Specialised Hospital : Tower
: Winterberg
Tertiary : 0
Clinics : 33
CHC : 1
Mobiles : 8

Health District : BUFFALO CITY
B Municipality : EC123, EC125, EC 126
Population : 816 400
Main Town : East London
District Hospitals : Komga
: Bisho
: East London
: Grey
: Grey Monument
: St James
: St Marks
: Nompomulelo
Regional Hospital : Cecelia Makiwana
: St Dominics
Specialised Hospital : Fort Grey
: Newhaven
: Nkqubela
Tertiary : Frere
Clinics : 98
CHC : 3
Mobiles : 19

Health District : KOUGA
B Municipality : EC106, EC108, EC109
Population : 134 446
Main Town : Humansdorp
District Hospitals : Sunday's River Valley
: Humansdorp
: B J Vorster
Regional Hospital : 0
Specialised Hospital : Kirkwood Care Centre
: Meyer
Tertiary : 0
Clinics : 36
CHC : 2
Mobiles : 10

Health District : MAKANA
B Municipality : EC104, EC105
Population : 123 708
Main Town : Grahamstown
District Hospitals : Settlers
: Port Alfred
Regional Hospital : 0
Specialised Hospital : Temba
: Marjorie Parrish
: Fort England
Tertiary : 0
Clinics : 25
CHC : 1
Mobiles : 9

Metro : NELSON MANDELA
Population : 969 771
Main Town : Port Elizabeth
District Hospitals : Cuyler
: Hunterscraig
: Oasim
: Uitenhage
: Westways
Regional Hospital : Dora Nginza
: Greenacres
: Livingstone
: Mercantile
: St George's
Specialised Hospital : Algoa Frail Care
: Elizabeth Donkin
: Empilweni
: Jose Pearson
: Orsmond
: Lorraine Frail Care
Tertiary : PE Provincial
Clinics : 60
CHC : 7

Health District : CAMDEBO
B Municipality : EC101, EC102, EC103, EC107
Population : 105 431
Main Town : Graaff-Reinet
District Hospitals : Aberdeen
: Midland
: Somerset East
: Jansenville
: Willowmore
Regional Hospital : 0
Specialised Hospital : Margery Parks
Tertiary : 0
Clinics : 23
CHC : 1
Mobiles : 11

KEY

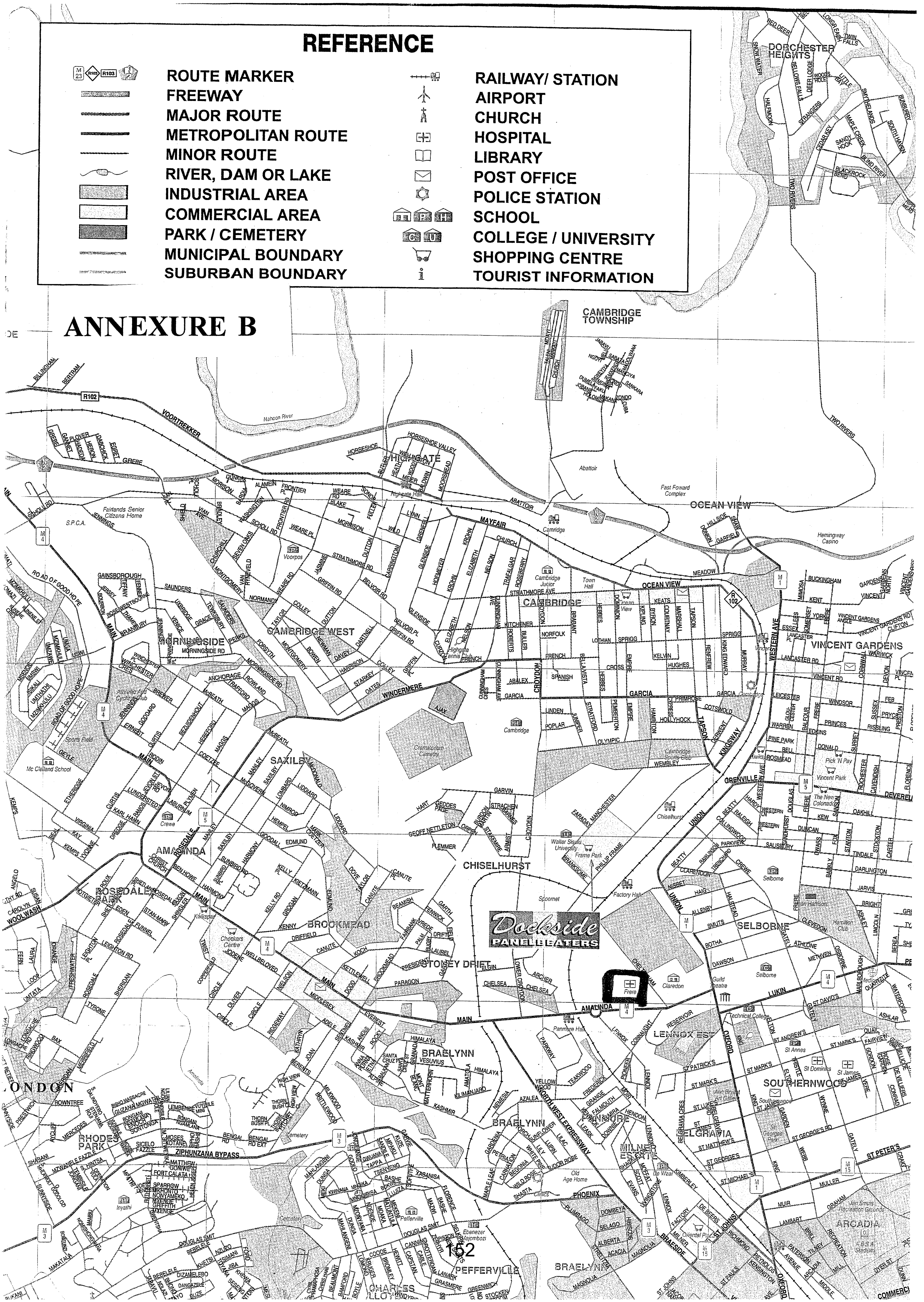
District Council Boundary

B Municipality Boundary

Health Sub-district

151

ANNEXURE B


REFERENCE
ROUTE MARKER
FREEWAY
MAJOR ROUTE
METROPOLITAN ROUTE
MINOR ROUTE
RIVER, DAM OR LAKE
INDUSTRIAL AREA
COMMERCIAL AREA
PARK / CEMETERY
MUNICIPAL BOUNDARY
SUBURBAN BOUNDARY
RAILWAY/ STATION
AIRPORT
CHURCH
HOSPITAL
LIBRARY
POST OFFICE
POLICE STATION
SCHOOL
COLLEGE / UNIVERSITY
SHOPPING CENTRE
TOURIST INFORMATION
DORCHESTER HEIGHTS
CAMBRIDGE TOWNSHIP
Nahoon River
HIGHGATE
OCEAN VIEW
CAMBRIDGE
CAMBRIDGE WEST
VINCENT GARDENS
MORNINGSIDE
SAXILBY
CHISELHURST
AMALINDA
ROSEDALE PARK
BROOKMEAD
STONEY DRIFT
Dockside PANELBEATERS
SELBORNE
LENNOX EST
BRAELYNN
SOUTHERNWOOD
BELGRAVIA
RHODES PARK
MILNER ESTATE
ARCADIA
PEFFERVILLE
Walter Sisulu University
Crematorium Cemetery
VOORTREKKER
MAIN
OCEAN VIEW
UNION
OXFORD
LUKIN
NORTH WEST EXPRESSWAY
ZIPHUNZANA BYPASS
PHOENIX
MAYFAIR
WINDERMERE
GRENVILLE

ANNEXURE C

A survey of the implementation of the National Guidelines for the management of pregnancy induced hypertension (PIH) by midwives at level 1 in the Eastern Cape.

Use the patient's record to fill in the required information in the spaces provided. Use a black pen, write legibly and tick where applicable. A checklist is to be used for each record.

A. DEMOGRAPHICS

1. Region/ District : 2. Date :

3. Age : 4. Referral : yes no

5. If referred, from where? .....

6.Transported / brought : yes no unknown

7. If yes, was she brought by an ambulance or own or public transport? .....

B. History taking

B –1 Antenatal care received at level 1 **Yes** **No**

Booked:

Yes		No		Unknown	

If yes, where?

Antenatal card present?

Gravida :

Parity :

Current pregnancy : Singleton Multiple

Comments

B- 2 Presence of risk factors as indicated on the antenatal clinic card

	Yes	No
Hypertension before pregnancy		
Hypertension early in pregnancy		
Hypertension and/convulsions in a previous pregnancy		
No antenatal care		
Previous intrauterine death due to complications of Hypertension		
Elderly primigravida		
Medical complications: Diabetes		
History/ present renal disease		
History/present cardiac disease		

Comments

B- 3 Was the following information given and recorded on the antenatal clinic card, related to patient education on signs and symptoms of PIH to report?

	Yes	No
Severe headache		
Blurring of vision		
Abdominal pain		
Vaginal bleeding		
Reduced foetal movements		
Increasing oedema		
Convulsions and		
Coma		

Comments

C. Diagnosis of PIH at level 1

C-1 Were the following signs an symptoms identified at level 1?

	Yes	No
Elevated BP 140/90 mmHg on 2 or more occasions		
Increased diastolic BP by 15 mmHg early in pregnancy		
Increased systolic BP by 30 mmHg early in pregnancy		
Oedema		
Proteinuria		

C- 2 Were secondary signs and symptoms of PIH present at level 1?

	Yes	No
Central nervous system: Severe headache		
Restlessness		
Hyperreflexia		
Visual disturbance		
Convulsions		
Coma		
Change in behaviour		
Cardiovascular system: Severe hypertension		
Headache		
Oedema		
Renal system: Proteinuria		
Haematuria		
Poor urinary output(> 1ml/kg/hr)		
Haematological system: Bruising		
Petechiae		
Bleeding from punctured Site		
Jaundice		
Liver: Jaundice		
Upper abdominal pain		
Placenta : Poor foetal growth		
Foetal distress		
Respiratory system: Pulmonary oedema		
Shortness of breath		

Comments

D. Management of PIH at level 1

D- 1 Was the BP at level 1 < 160/110 mmHg, no oedema, no proteinuria, no secondary signs and symptoms Yes No

D-1.1 Was the following done at level	Yes	No
Consider admitting or referral		
Start antihypertensives		
Review in 2- 3 days		

Comments

D- 2 Was the BP at level > 160/110 mmHg, <18 years, > 35 years, Protenuria, oedema, secondary signs and symptoms at level 1 **Yes** **No**

D- 2.1 Was the following done at level 1	**Yes**	**No**
Immediate referral		
Admission		
Preload with Ringer's lactate solution 300ml over 20 min.		
Use one of the rapid acting drugs to lower BP		
Control diastolic at 90- 100mmhg		
Consider giving magnesium sulphate prophylactically		
Exclude foetal distress clinically		
Assess renal function		
Assess foetal condition and gestational age		
Obtain consultant advice		
Give steroids if gestational age is 27-34 weeks		

Comments

D- 3 Did the patient develop eclampsia at level 1 **Yes** **No**

D- 3.1 Was the following done at level 1	**Yes**	**No**
Turn woman on left lateral		
Clear airway , insert oropharyngeal airway and give 02		
Call for help		
Put up Ringer's lactate/ solution IVI		
Dilute MgSO4 4g with 12 ml normal saline		
Administer slowly IVI over 4 minutes		
Inject 5g into each buttock		
Insert Foley's catheter and measure urine output hourly		
Measure BP every 15 minutes until stabilised, 90-100 mmHg		
Control BP using rapid acting drugs e.g.nifedipine,dihydralazine, labetalol etc.		
Monitor foetal condition		
Limit fluids to 80ml/ hour		
Arrange for transfer		
Continue with MgSO4 5g IMI every 4 hours or		
IVI 1g/hr following a loading dose of 4g		
Give calcium gluconate 10 ml of a 10% solution in case of MgSO4 toxicity		

E. Referral from level 1 for PIH

E-1.1 Were any of the following referring criteria present at level 1

	Yes	No
Comatose or semicomatose patient or other CNS Damage		
Signs of poor coagulation		
APH or abruptio placenta		
Renal failure		
Underlying cardiac disease		
Abnormal liver function test		
Lung oedema		
Coagulation deficiency		
Postpartum haemorrhage		
Urine output < 60 ml in 4 hrs.		
Prematurity 28- 32 weeks		

Comments

E- 1.2 Was the patient referred **Yes** **No**

Comments

E- 1.3 Were criteria for transporting a patient met

	Yes	No
Sick patient transferred directly to a tertiary hospital		
Consultation with the receiving hospital before		
Essential information sent with the patient		
Patient accompanied by an experienced midwife/		
Health care provider		

Comments

ANNEXURE D1

FORM CRHS (2000)

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

APPLICATION[1] TO THE COMMITTEE FOR RESEARCH ON HUMAN SUBJECTS (MEDICAL) FOR CLEARANCE OF RESEARCH INVOLVING HUMAN SUBJECTS, OR PATIENT RECORDS.

NAME : Ms Msimango N.S.

PROFESSIONAL STATUS : Student, third year

UNIVERSITY DEPARTMENT : Nursing Science Dept.

HOSPITAL/INSTITUTION WHERE EMPLOYED : Frere Nursing College

FULL- TIME OR PART- TIME : Part- time

e- mail address : lmagengelele@grinaker-lta.com

TELEPHONE AND EXTENSION : 043 7092136/2411

CELL : 0824222810

FAX : 0437439949

TITLE OF RESEARCH PROJECT : A survey of the Implementation of the management of Pregnancy Induced Hypertension by midwives at level 1 in the Eastern Cape.

WHERE WILL THE RESEARCH BE CARRIED OUT? Cecilia Makiwane and Frere hospitals in Maternity Department.

1. PURPOSE OF THE RESEARCH :

Postgraduate : Degree (MSc)

2. OBJECTIVES OF THE RESEARCH :

- To describe the implementation of the National Guidelines for the management of pregnancy induced hypertension by midwives at level 1 health care.

- To make recommendations for the midwifery management of pregnancy induced hypertension at level 1 health care.

3. SUMMARY OF THE RESEARCH PLAN

The study is undertaken to determine the implementation of the National Guidelines for maternal care for the management of Pregnancy Induced Hypertension by the midwife at level 1 health care. The intention is also to make recommendations for the midwifery management so as to reduce maternal mortality and morbidity due to pregnancy induced hypertension. The research design will be quantitative, descriptive and contextual study. The research method to used will a retrospective record review of patients admitted with pregnancy induced hypertension at a level 3 hospital. The records to be reviewed will be those obtained from level 1 following referral. Records will be reviewed at level 3 rather than level1 as this is the referral hospital for pregnancy induced hypertension from level 1. Records will be reviewed by means of a researcher administered checklist. The checklist has been designed in accordance with the National guidelines for the management of pregnancy induced hypertension (DOH, 2001). Each guideline for the management of pregnancy induced hypertension is included in the checklist. The sample will include all women admitted to level 3 with pregnancy induced hypertension diagnosis. Only patients who received midwifery care and were referred via level 1 from May 1999- June 2003 will be included.
Data analysis will be done by means of descriptive statistics.
Finally a research report will be written and copies sent to the University, Denosa, Eastern Cape Department of Health, Cecilia Makiwane and Frere hospitals.

4. REQUIREMENTS

4.1 No radiation is to be used

4.2 Written consent will be obtained from the Provincial

Department of Health Nursing Directorate. See attached Letter.

4.3 Yes, checklist is attached.

5.1 Records of all patients admitted to level 3 hospital referred from level 1 with pregnancy induced hypertension and were managed by midwives will be used. The records will be identified from the admission book in the labour ward admission unit. Thereafter the records will be retrieved from the section where these are kept.

5.2 Subjects will be selected and no recruiting will be done.

5.3 No control subjects will be used.

5.4 Antenatal clinic card, admission, labour and puerperium records.

5.5 Childbearing age, 15-49 years

5.6 SEX : Females

5.7 Benefits to patients or subjects : No direct way as this is a retrospective record review study, but to improve midwifery care to patients to reduce maternal mortality and morbidity due to PREGNANCY INDUCED HTPERTENSION.

5.8 Number of patients : +- 200

5.9 Participation or non- participation will not disadvantage them.

6. PROCEDURES

6.1 Record review

6.2 Procedures are routine for management

6.3 Researcher Ms Msimango Nombuyiselo Susan, a lecturer at Frere Nursing College.

6.4 The research will commence as soon as permission to go ahead with the research is granted and will be conducted for two (2) months.

7. RISKS OF THE PROCEDURE(S) SUBJECTS/ CONTROLS WILL SUFFER:

No risks

8. GENERAL

8.1 Has permission of relevant authorities been obtained?

Yes

8.2 Confidentiality : Anonymity, coding, the researcher will be the only one using the records at the time of data collection and records will be kept under lock and key when not in use.

8.3 Results : These will be made available to the University, Denosa, Eastern Cape Department of Health and the two referral hospitals.

8.4 Finances : Other, yes.

- To pay personnel for typing, statistician, proof reading etc.
- Supplies e.g. paper
- To pay for printing and duplicating material

If there is no assistance the researcher will be responsible for costs incurred.

How will the research be funded?

Assistance will be asked from the Provincial Maternal Child and Women's Health (MCWH).

8.5 Any other information which may be of value to the committee :

Help in the form of funds from MCWH has not been asked as I have to submit the proposal as well, though the intention for applying for funds was shared over a telephone conversation.

Date :2003.09.05 Applicant's Signature :

Who will supervise the project?
Name CANDICE BODKIN Department : NURSING EDUCATION.

Date 2003/9/5 Signature : pp. MRS BODKIN

Head/ ~~Research Coordinator~~ of Department/ ~~Institute~~ to which study was conducted :

ANNEXURE D2

UNIVERSITY OF NATAL
DURBAN, PIETERMARITZBURG & EDGEWOOD CAMPUSES

Faculty of Medicine
Obstetrics and Gynaecology
✉ Private Bag 7 Congella 4013 South Africa
Telephone +27 (0)31 260 4250/260 4220
Facsimile +27 (0)31 260 4427
e-mail: gynae@nu.ac.za

JM/GSS

4 August 2003

Fax: 043-7434 265

Mrs N Msimango,
Frere Nursing College,
Private Bag X9023,
Buffalo City,
5200

Dear Mrs Msimango,

Your fax of the 1st August 2003 has reference. The National Committee for Confidential Enquiries into Maternal Deaths assessors forms are strictly confidential and although I understand the need for research, the overall commitment to confidentiality must be maintained. You however are entitled to the demographic data on the first page of the maternal death form but permission for this must be obtained from the individual province.

I am sorry to disappoint you, but am able to give advice to any other issues related to your study.

Yours sincerely,

J MOODLEY

Professor,
Department of Obstetrics and Gynaecology

ANNEXURE D3

Ethics Committee : Region C Eastern Cape

Postal Address :
C/o East London Health Resource Centre
PO Box 12882
Amalinda
5252
Telephone : 043 –7092386

Physical Address :
Cheltenham Road
East London
5201 South Africa

Fax no.: 043 – 7092346

15 October 2003

Mrs Msimango
102 N.u.1
Mdantsane
5219

Dear Mrs Msimango

RE: APPLICATION TO DO A RESEARCH STUDY ON MIDWIFERY

There is no ethical objection to this study. Permission to proceed is granted.

Yours sincerely

pp.
Dr P Swift – Chairman Region C Ethics Committee

ANNEXURE D4

PROVINCE OF THE EASTERN CAPE
ISEBE LEZEMPILO / DEPARTMENT OF HEALTH
EAST LONDON HOSPITAL COMPLEX

FRERE HOSPITAL

X9047
East London 5200
Reference:
Imibuzo: Dr N Pandey
Email: pandeyn@hlthfre.ecape.gov.za
☎ : 043-7092015
Fax : 043-7092484

REGION C

CECILIA MAKIWANE HOSPITAL

X13003
Cambridge 5206
Irefrensi:
Enquiries:
Email:
☎ 043-7082111
Ifaxi: 043-7611158

Date / Umhla : 08 October 2003

Mrs Msimango
102 NU 1
Mdantsane
EAST LONDON
5219

Dear Mrs Msimango

RE: APPLICATION FOR PERMISSION TO DO A RESEARCH STUDY ON MIDWIFERY

Your letter dated 06 October 2003 has reference.

You are advised to contact Mrs Murray – Assistant Director : Maternity at telephone number 7092017 to make the necessary arrangements.

Yours faithfully

DR N M PANDEY
CHIEF MEDICAL SUPERINTENDENT : CLINICAL HEAD : ELHC
NMP/bs

Cc Mrs Murray

ANNEXURE E

1 Dec 2004, 21:27:42

```
. for var district - e1_3acc: tab X

-> tab district
```

District	Freq.	Percent	Cum.
Alfred Nzo	1	0.34	0.34
Amatole	270	92.47	92.81
Chris Hani	13	4.45	97.26
O.R. Thamb	1	0.34	97.60
U-Kwahlam	7	2.40	100.00
Total	292	100.00	

```
-> tab age
```

age	Freq.	Percent	Cum.
14	1	0.34	0.34
16	5	1.71	2.05
17	7	2.40	4.45
18	9	3.08	7.53
19	11	3.77	11.30
20	10	3.42	14.73
21	10	3.42	18.15
22	13	4.45	22.60
23	14	4.79	27.40
24	18	6.16	33.56
25	18	6.16	39.73
26	12	4.11	43.84
27	16	5.48	49.32
28	25	8.56	57.88
29	14	4.79	62.67
30	17	5.82	68.49
31	13	4.45	72.95
32	19	6.51	79.45
33	8	2.74	82.19
34	12	4.11	86.30
35	14	4.79	91.10
36	6	2.05	93.15
37	6	2.05	95.21
38	2	0.68	95.89
39	2	0.68	96.58
40	2	0.68	97.26
41	4	1.37	98.63
42	2	0.68	99.32
43	1	0.34	99.66
46	1	0.34	100.00
Total	292	100.00	

```
. summ age
```

Variable	Obs	Mean	Std. Dev.	Min	Max
age	292	27.4863	6.14178	14	46

```
-> tab refer

      refer |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |         49       16.84       16.84
          y |        242       83.16      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab hcc

        HCC |      Freq.     Percent        Cum.
------------+-----------------------------------
    Adelaide |          1        0.34        0.34
Aliwal Nort |          3        1.03        1.37
 Alphandale |          9        3.09        4.47
  Aspiranza |          4        1.37        5.84
         BB |          3        1.03        6.87
   Beacon B |          5        1.72        8.59
    Bedford |          2        0.69        9.28
      Berea |          1        0.34        9.62
 Border tec |          1        0.34        9.97
    Braelyn |         18        6.19       16.15
  Burgersdo |          2        0.69       16.84
 Butterwort |          1        0.34       17.18
Butterworth |          3        1.03       18.21
       Cala |          3        1.03       19.24
  Cambridge |          4        1.37       20.62
   Cathcart |          2        0.69       21.31
    Central |         23        7.90       29.21
 Chris Hani |          2        0.69       29.90
       DVDH |         27        9.28       39.18
     Daliwe |          1        0.34       39.52
   Dodrecht |          1        0.34       39.86
     Duncan |          1        0.34       40.21
     Elliot |          1        0.34       40.55
         FB |          1        0.34       40.89
         FG |          2        0.69       41.58
  Fort Beau |          2        0.69       42.27
  Fort Grey |          4        1.37       43.64
   Frontier |          4        1.37       45.02
  Glen Grey |          3        1.03       46.05
      Gompo |         34       11.68       57.73
    Gompo_B |          1        0.34       58.08
    Gonubie |          2        0.69       58.76
   Good Hop |          1        0.34       59.11
 Greenfield |          8        2.75       61.86
Greenfields |          7        2.41       64.26
         JD |          9        3.09       67.35
     Jabavu |          7        2.41       69.76
  John Dube |          6        2.06       71.82
      Jwayi |          1        0.34       72.16
  Kei Mouth |          1        0.34       72.51
  Kei mouth |          2        0.69       73.20
      Komga |          3        1.03       74.23
     Komgha |          3        1.03       75.26
   Kwelerha |          5        1.72       76.98
 Ma- Afrika |          1        0.34       77.32
   Mdatsane |          7        2.41       79.73
    Molteno |          2        0.69       80.41
```

Mt. Ayliff	1	0.34	80.76
Mzamomhle	1	0.34	81.10
Nahoon	1	0.34	81.44
Ndende	1	0.34	81.79
Ndevana	2	0.69	82.47
Needs ca	2	0.69	83.16
Needscamp	3	1.03	84.19
Newlands	2	0.69	84.88
Openshaw	1	0.34	85.22
Oppenshaw	2	0.69	85.91
Pefferville	16	5.50	91.41
Petros Job	2	0.69	92.10
Potsdam	1	0.34	92.44
Prime cure	1	0.34	92.78
Qhuru	1	0.34	93.13
Queenstw	1	0.34	93.47
Quigney	1	0.34	93.81
Self Referr	2	0.69	94.50
Sotho	2	0.69	95.19
Southern	1	0.34	95.53
Sterkspruit	1	0.34	95.88
Stutterhe	2	0.69	96.56
Umtata	1	0.34	96.91
Wesely	1	0.34	97.25
Zanempilo	8	2.75	100.00
Total	291	100.00	

-> tab transp

Transp	Freq.	Percent	Cum.
1	17	5.84	5.84
2	97	33.33	39.18
3	162	55.67	94.85
4	15	5.15	100.00
Total	291	100.00	

-> tab b_1_booked

B_1_Booked	Freq.	Percent	Cum.
y	291	100.00	100.00
Total	291	100.00	

-> tab anc_card

ANC_card	Freq.	Percent	Cum.
n	44	15.12	15.12
y	247	84.88	100.00
Total	291	100.00	

```
-> tab grav

       Grav |      Freq.     Percent        Cum.
------------+-----------------------------------
          1 |         132       45.36       45.36
          2 |          83       28.52       73.88
          3 |          45       15.46       89.35
          4 |          21        7.22       96.56
          5 |           9        3.09       99.66
          6 |           1        0.34      100.00
------------+-----------------------------------
      Total |         291      100.00

-> tab parity

     Parity |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |         143       49.14       49.14
          1 |          83       28.52       77.66
          2 |          46       15.81       93.47
          3 |          13        4.47       97.94
          4 |           5        1.72       99.66
          5 |           1        0.34      100.00
------------+-----------------------------------
      Total |         291      100.00

-> tab cur_preg

   CUR_Preg |      Freq.     Percent        Cum.
------------+-----------------------------------
          m |           8        2.75        2.75
          s |         282       96.91       99.66
         sn |           1        0.34      100.00
------------+-----------------------------------
      Total |         291      100.00

-> tab b2hptb4pr

  B2hptb4pr |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |         275       94.50       94.50
         nc |           4        1.37       95.88
          y |          12        4.12      100.00
------------+-----------------------------------
      Total |         291      100.00

-> tab b2hptelypr

 B2hptelypr |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |         284       97.59       97.59
         nc |           4        1.37       98.97
          y |           3        1.03      100.00
------------+-----------------------------------
      Total |         291      100.00
```

```
-> tab b2hpt_copr

 B2hpt_copr |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        273       93.81       93.81
         nc |          4        1.37       95.19
          y |         14        4.81      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b2noancar

  B2noancar |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        287       98.63       98.63
         nc |          4        1.37      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b2prv_iud2hp

B2prv_iud2h |
          p |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        280       96.55       96.55
         nc |          3        1.03       97.59
         nn |          1        0.34       97.93
          y |          6        2.07      100.00
------------+-----------------------------------
      Total |        290      100.00

-> tab b2_eldlypr

 B2_eldlypr |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        281       96.56       96.56
         nc |          3        1.03       97.59
          y |          7        2.41      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b2_diabets

 B2_diabets |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        286       98.28       98.28
         nc |          4        1.37       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b2_renal

   B2_renal |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        286       98.28       98.28
         nc |          5        1.72      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab b2_cardiac

 B2_cardiac |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        282       96.91       96.91
         nc |          5        1.72       98.63
          y |          4        1.37      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_headac

  B3_headac |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        270       92.78       92.78
        n/c |          1        0.34       93.13
         nc |         19        6.53       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_blur_vsn

B3_blur_vsn |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        270       92.78       92.78
         nc |         20        6.87       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_abd_pain

B3_abd_pain |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        273       93.81       93.81
         nc |         17        5.84       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_red_f_mt

B3_red_f_mt |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        271       93.13       93.13
         nc |         20        6.87      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_pv_bld

  B3_pv_bld |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        270       92.78       92.78
         nc |         20        6.87       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab b3_incr_oe

 B3_incr_oe |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        269       92.44       92.44
         nc |         20        6.87       99.31
         nn |          1        0.34       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_convu_

  B3_convu_ |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        270       92.78       92.78
         nc |         20        6.87       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab b3_coma

    B3_coma |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        270       92.78       92.78
         nc |         20        6.87       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c1proten

   C1proten |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          2        0.69        0.69
        n_a |        196       67.35       68.04
          y |         93       31.96      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c1_oed

     C1_oed |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          5        1.72        1.72
        n_a |        151       51.89       53.61
          y |        135       46.39      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c1_sys30

   C1_sys30 |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          2        0.69        0.69
        n_a |        190       65.29       65.98
          y |         99       34.02      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab c1_dia5

    C1_dia5 |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          2        0.69        0.69
        n_a |        190       65.29       65.98
          y |         99       34.02      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c1_bp_140_90___

C1_bp_140_9 |
       0___ |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          3        1.03        1.03
        n_a |        230       79.04       80.07
          y |         58       19.93      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c2_sevhea

  C2_sevhea |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        286       98.62       98.62
        n_a |          3        1.03       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        290      100.00

-> tab c2_restln

  C2_restln |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        286       98.28       98.28
        n_a |          3        1.03       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c2_hyprefl

 C2_hyprefl |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        285       97.94       97.94
        n_a |          3        1.03       98.97
          y |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab c2_vis_dist

C2_vis_dist |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        283       97.25       97.25
        n_a |          3        1.03       98.28
          y |          5        1.72      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c2_convu

   C2_convu |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        283       97.25       97.25
        n_a |          3        1.03       98.28
          y |          5        1.72      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c2_coma

    C2_coma |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c2_chngbe

  C2_chngbe |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        285       97.94       97.94
        n_a |          3        1.03       98.97
         nn |          1        0.34       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab c2_sev_hpt

 C2_sev_hpt |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        272       94.12       94.12
        n_a |          3        1.04       95.16
          y |         14        4.84      100.00
------------+-----------------------------------
      Total |        289      100.00

-> tab c2_cvs_he

  C2_cvs_he |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        241       82.82       82.82
        n_a |          2        0.69       83.51
          y |         48       16.49      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
->  tab cvs_oed

    cvs_oed |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        138       47.59       47.59
        n_a |          1        0.34       47.93
         ny |          1        0.34       48.28
          y |        150       51.72      100.00
------------+-----------------------------------
      Total |        290      100.00

->  tab rs_proten

  rs_proten |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        184       63.23       63.23
        n_a |          2        0.69       63.92
          y |        105       36.08      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab rs_haema

   rs_haema |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        275       94.50       94.50
        n_a |          3        1.03       95.53
          y |         13        4.47      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab rs_p_u_otpt

rs_p_u_otpt |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab hm_bruisn

  hm_bruisn |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab hm_petec

   hm_petec |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab hs_blg_p_si

hs_blg_p_si |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab hs_jaund

   hs_jaund |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab lv_jaundi

  lv_jaundi |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab lv_u_abd_p

 lv_u_abd_p |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        272       93.79       93.79
        n_a |          3        1.03       94.83
          y |         15        5.17      100.00
------------+-----------------------------------
      Total |        290      100.00

-> tab pl_pf_gro

  pl_pf_gro |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        287       98.63       98.63
        n_a |          3        1.03       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab pl_fot_dis

 pl_fot_dis |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        288       98.97       98.97
        n_a |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab rsp_pu_oed

 rsp_pu_oed |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        286       98.28       98.28
        n_a |          3        1.03       99.31
         nn |          1        0.34       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab rsp_sht_brt

rsp_sht_brt |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        284       97.59       97.59
        n_a |          3        1.03       98.63
          y |          4        1.37      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d1adm_or_rf

D1adm_or_rf |      Freq.     Percent        Cum.
------------+-----------------------------------
        _n_a |          1        0.34        0.34
        n/a |        123       42.27       42.61
        n_a |         63       21.65       64.26
          r |          2        0.69       64.95
          y |        102       35.05      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d1strt_antihy

D1strt_anti |
         hy |      Freq.     Percent        Cum.
------------+-----------------------------------
    already |          1        0.34        0.34
        n/a |        179       61.51       61.86
        n_a |        108       37.11       98.97
          y |          3        1.03      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d1revw_2or3

D1revw_2or3 |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        179       61.51       61.51
        n_a |        108       37.11       98.63
          y |          4        1.37      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab d2_immd_rfr

D2_immd_rfr |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          2        0.69        0.69
        n/a |        130       44.67       45.36
        n_a |         76       26.12       71.48
          y |         83       28.52      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2_admiss

  D2_admiss |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        181       62.20       62.20
        n_a |        108       37.11       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2_prel_rin_300

D2_prel_rin |
       _300 |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        182       62.54       62.54
        n_a |        109       37.46      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2drgs2lbp

 D2drgs2lbp |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        175       60.14       60.14
        n_a |        108       37.11       97.25
          y |          8        2.75      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2cntrl_dia

D2cntrl_dia |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        176       60.48       60.48
        n_a |        109       37.46       97.94
          y |          6        2.06      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2givmgs

   D2givMgS |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        182       62.54       62.54
        n_a |        109       37.46      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab d2excd_fd

  D2excd_fd |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        180       61.86       61.86
        n_a |        105       36.08       97.94
          y |          6        2.06      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2ass_rl_fn

D2ass_rl_fn |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        182       62.54       62.54
        n_a |        107       36.77       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2ass_fcga

D2ass_fc,ga |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        166       57.04       57.04
        n_a |        104       35.74       92.78
          y |         21        7.22      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2cons_adv

 D2cons_adv |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.57       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d2gv_strod

 D2gv_strod |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          1        0.34        0.34
        n/a |        184       63.23       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d3tn_lt_lat

D3tn_lt_lat |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        186       63.92       63.92
        n_a |        104       35.74       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab d3clr_airw

 D3clr_airw |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.57       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d3_ivi_ring

D3_ivi_ring |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.57       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d3dil_mgs

  D3dil_MgS |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.79       63.79
        n_a |        104       35.86       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        290      100.00

-> tab d3ivi_4min

 D3ivi_4min |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        187       64.26       64.26
        n_a |        104       35.74      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d35g_butk

  D35g_butk |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        186       63.92       63.92
        n_a |        104       35.74       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d3_f_cathe

 D3_f_cathe |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        186       63.92       63.92
        n_a |        104       35.74       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
->  tab d3bp_1_4l

  D3BP_1_4l |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.57       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab d3contr_bp

 D3contr_bp |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        186       63.92       63.92
        n_a |        104       35.74       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab d3mon_fco

  D3mon_fco |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        186       63.92       63.92
        n_a |        104       35.74       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab d3limt_flds

D3limt_flds |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        187       64.26       64.26
        n_a |        104       35.74      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab d3transfer

 D3transfer |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.57       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00

->  tab d3cnt_mgs

  D3cnt_mgs |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        185       63.57       63.57
        n_a |        104       35.74       99.31
          y |          2        0.69      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab d3fflg_lod_d

D3fflg_lod_ |
          d |      Freq.     Percent        Cum.
------------+-----------------------------------
        n/a |        187       64.26       64.26
        n_a |        104       35.74      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab d3gv_ca_gl

 D3gv_ca_gl |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          1        0.34        0.34
        n/a |        187       64.26       64.60
        n_a |        102       35.05       99.66
         nn |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab e1cnsdam

   E1cnsdam |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        191       65.64       65.64
        n_a |         99       34.02       99.66
          y |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab e1sg_prcoa

 E1sg_prcoa |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        191       65.64       65.64
        n_a |         99       34.02       99.66
         no |          1        0.34      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab e1_aph

     E1_APH |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        189       64.95       64.95
        n_a |         94       32.30       97.25
    results |          1        0.34       97.59
          y |          7        2.41      100.00
------------+-----------------------------------
      Total |        291      100.00
```

```
-> tab e1_renl_flr

E1_renl_flr |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        116       39.86       39.86
        n_a |         53       18.21       58.08
         of |          1        0.34       58.42
          y |        121       41.58      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab e1cdc_dis

     E1cdc_dis |      Freq.     Percent        Cum.
---------------+-----------------------------------
investigations |          1        0.34        0.34
             n |        194       66.67       67.01
           n_a |         96       32.99      100.00
---------------+-----------------------------------
         Total |        291      100.00

-> tab e1abn_lft

  E1abn_lft |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        113       39.10       39.10
        n_a |         50       17.30       56.40
          y |        126       43.60      100.00
------------+-----------------------------------
      Total |        289      100.00

-> tab e1lng_oed

  E1lng_oed |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        186       64.36       64.36
        n_a |         98       33.91       98.27
          y |          5        1.73      100.00
------------+-----------------------------------
      Total |        289      100.00

-> tab e1coag_de

  E1coag_de |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        174       60.00       60.00
        n_a |         93       32.07       92.07
          y |         23        7.93      100.00
------------+-----------------------------------
      Total |        290      100.00

-> tab e1_pph

     E1_PPH |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |        190       65.74       65.74
        n_a |         99       34.26      100.00
------------+-----------------------------------
      Total |        289      100.00
```

```
-> tab e1otpt_60

 E1otpt_60 |      Freq.     Percent        Cum.
-----------+-----------------------------------
         n |        190       65.74       65.74
       n_a |         99       34.26      100.00
-----------+-----------------------------------
     Total |        289      100.00

-> tab e1prm28_

  E1prm28_ |      Freq.     Percent        Cum.
-----------+-----------------------------------
         n |        180       62.07       62.07
       n_a |         99       34.14       96.21
         y |         11        3.79      100.00
-----------+-----------------------------------
     Total |        290      100.00

-> tab e1_3tertiar

E1_3tertiar |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |         13        4.47        4.47
        n/a |         24        8.25       12.71
          y |        254       87.29      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab e1_3con

   E1_3con |      Freq.     Percent        Cum.
-----------+-----------------------------------
         n |        286       98.28       98.28
         y |          5        1.72      100.00
-----------+-----------------------------------
     Total |        291      100.00

-> tab e1_3_info_

 E1_3_info_ |      Freq.     Percent        Cum.
------------+-----------------------------------
          n |          6        2.06        2.06
          y |        285       97.94      100.00
------------+-----------------------------------
      Total |        291      100.00

-> tab e1_3acc

   E1_3acc |      Freq.     Percent        Cum.
-----------+-----------------------------------
health prov |         99       34.02       34.02
        unk |        192       65.98      100.00
-----------+-----------------------------------
      Total |        291      100.00
```

ANNEXURE F

HESTER HONEY

LANGUAGE CONSULTANT
91 BRANDWACHT STREET, STELLENBOSCH 7600
TELEPHONE / FAX 021 886 4541
E-mail: hestermh@netactive.co.za

This is to certify that I have read the research report prepared by

Mrs N MSIMANGO

Titled

Survey of the implementation of the National Guidelines for the Management of Pregnancy-induced Hypertension by Midwives at level-1 clinics in the Eastern Cape

and have made recommendations concerning language use, technical aspects and references to be implemented by her.

Relevant information about my involvement with English language editing is as follows:

Qualifications:	BA Honours (English)	University of Stellenbosch	1988
	Higher Primary Teacher's Certificate		1959
	Bilingual Certificate AE		1958
Experience:	**Working as Translator and Editor**		**since 1993**
	(involved with official University documentation, dissertations, theses, research reports, year book entries, conference papers and lecture notes for various disciplines, inter alia covering Business Management, Consumer Science, Education, Fine Arts, Futures Research, Industrial Psychology, Geography, Law, Physics, Soil Science, Theology, Medicine)		
	Teaching English as a Secondary School subject		**1987, 1989**
	Conducting private classes in English		**since 1993**
	(involving school learners, foreign students and members of the public)		
	Editing and Translating for Stellenbosch University Language Services Department		

H M Honey

(23/02/2009)

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