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MIDWIVES' KNOWLEDGE AND SKILLS OF DIAGNOSING HYPERTENSIVE DISORDERS DURING PREGNANCY IN SELECTED FACILITIES IN VHEMBE DISTRICT, SOUTH AFRICA

by

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DECLARATION

I, **Chuki Sarah Mkansi**, declare that this thesis titled, **Midwives' Knowledge and Skills of Diagnosing Hypertensive Disorders During Pregnancy at Selected Facilities in Vhembe District, South Africa'** has not been submitted previously for a degree at this or any other University, and that it is my own work in design and in execution, and that all reference materials contained herein have been duly acknowledged.

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DEDICATION

This study is dedicated to Almighty God, the creator of the universe,
the reason for my existence. To God be the glory.

I also dedicate this study to my husband, Daniel Mkansi, my children Nkateko, Rejoice, and Minkhenso, for their full support, encouragement, sacrifices, and being there all the way. They are pillars indeed.

The study is dedicated as well to my parents, both biological and spiritual, for their contribution to the person that I am today.

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God has been the strength of my life throughout this long journey.
To God be the glory.

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ABSTRACT

Midwives' knowledge and skills which include history taking, blood pressure measurement and urinalysis play an important role in diagnosing the hypertensive disorder in pregnancy. Hypertensive disorders are the contributory factors to morbidity and perinatal mortality rate. The purpose of this study was to assess the knowledge and skills of midwives in diagnosing hypertensive disorders during pregnancy in selected facilities in Vhembe District, South Africa. The study was quantitative, descriptive, and explanatory. The population was midwives in eight selected health facilities in Vhembe District, South Africa. Four Hospitals and four health centres were selected according to the high number of admission and consultation of pregnant women. The researcher used systematic sampling to get the respondents (n=77) from the total population (N=194). Data were collected by using questionnaires, where all midwives in selected facilities responded to the questionnaires. The validity and reliability of the instrument were assured. Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 25. Voluntary informed consent was signed, freedom from harm, right to full disclosure, the right to self-determination, and anonymity were assured. The results were presented in the form of tables and graphs. Data revealed the average knowledge of midwives in diagnosis of hypertensive disorders and limited knowledge in displaying the skills which can lead to proper diagnosis in pregnancy. Recommendations include that curriculum developers in the stream of midwifery enforce the continuity of knowledge and skills update after training and graduating from college and university.

Keywords: assessment, diagnosis, hypertension knowledge, monitoring, pregnancy, skills

LIST OF ACRONYMS

ANC	Antenatal Care
BP	Blood Pressure
CEO	Chief Executive Officer
ESMOE	Essential Steps in Managing Obstetric Emergencies
FBC	Full Blood Count
HELLP	Haemolysis Elevated Liver Enzyme and Low Platelet Counts
HPD	Hypertensive Disorder in Pregnancy
ISSPH	International Society for the Study of Hypertension in Pregnacy
LFT	Liver Function Test
MgSO$_4$	Magnesium Sulphate
mmHg	Millimetres of Mercury
PHC	Primary Health Care
PIH	Pregnancy Induced Hypertension
SANC	South African Nursing Council
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

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CHAPTER 1

OVERVIEW OF THE STUDY

1.1   Introduction

Hypertensive disorders in pregnancy are one of the most common direct causes of maternal mortality and are also responsible for significant perinatal and maternal morbidity. These disorders include the following: chronic hypertension, pre-eclampsia, eclampsia, and HELLP (Haemolysis Elevated Liver Enzyme and Low Platelet Counts) syndrome, which is the presence of haemolysis, elevated liver enzymes, and low platelets. Early diagnosis of hypertensive disorders and timely intervention are essential to prevent perinatal complications (Department of Health, 2016).

1.2   Background

Hypertensive disorders are the most common medical problem encountered during pregnancy and is a leading cause of perinatal, maternal morbidity, and mortality (Queensland Clinical Guideline, 2016). It constitutes one of the greatest causes of maternal and neonatal mortality because it complicates up to 10% of pregnancies worldwide. This demands the knowledge and skills of midwives to reduce complications (The American College of Obstetrician and Gynaecologists, 2013). Midwives are the primary contacts who should diagnose and manage all uncomplicated antenatal conditions without the supervision of the obstetrician and must be able to identify complications and refer cases. Midwives have the responsibility of diagnosing hypertensive disorders through assessment and screening the patients before the doctor ultimately makes the final diagnosis.

Wiley (2015) estimates that hypertension in pregnancy causes one in every eight deaths, making it the third leading cause of maternal deaths in the world. Hypertensive disorders complicate approximately 5–10% of pregnancies in the United States. In Indonesia, 18 000 women die every year due to pregnancy, the main cause of death is high-risk pregnancy and other conditions, hypertensive disorders being one of the conditions (Surpriyant, Fariz, Septian Murdyantoro, and Ramadhani & Widodo, 2015). A study conducted in India by Ramadurg & Vindler (2016) found that there is still a gap in the knowledge of health workers in the management of pre-eclampsia.

Dongue (2014) asserted that hypertension is associated with about 16% of maternal mortalities which are the leading causes of maternal death in Sub-Saharan Africa. In Nigeria, community health workers' knowledge and practices concerning pre-eclampsia were researched. Their findings showed that health workers had basic knowledge of pre-eclampsia, but lack confidence in its detection and management. The main aim was to strengthen maternal survival, that even if women are having pre-eclampsia measures can be taken to prevent complications and deaths (Sotunsa & Vindler, 2016). The statistics in South Africa for maternal deaths for 2011-2012, accounted for 66% of avoidable deaths of which hypertension contributed 16.5% (Stellenburg & Ngwekazi, 2016). The guidelines for maternity in South Africa (Department of Health, 2016) indicated that most maternal deaths (66.7%) were possibly and probably preventable. Stellenburg & Ngwekazi (2016) in their study of the knowledge of midwives about hypertensive disorders also concluded that measures are needed to improve the knowledge of midwives.

Du Toit (2013) believed there seems to be limited information on the knowledge and skills of nurses in South Africa regarding the correct measurement of BP when using a sphygmomanometer and auscultatory methods. The incorrect measurement may lead to misdiagnosis of hypertensive disorders which may result in complications. The

study "Knowledge Towards Pregnancy-Induced Hypertension Amongst Pregnant Women" which was conducted in Vhembe District by Maputle, Khoza, and Lebese (2015) found that midwives do educate women about their condition. However, morbidity and mortality remained high. The South African Nursing Council (SANC, 1984) regulations relating to the *Scope of Practice of Midwives* guide the practice of midwives. The scope entails diagnosing health needs and facilitating the attainment of optimum physical health for the mother and child by prescribing midwifery regimen and referral, where necessary, and monitoring the vital signs of the mother and child. Hence, the scope promotes the prevention of complications relating to pregnancy and coordination of health care regimens provided for the mother by appropriate categories of health care.

Stellenburg & Ngwekazi (2016) indicated that 14–38% of maternal deaths, at district and regional hospitals, are health care-related, poor assessment, delays in referrals, poor monitoring and not following standard protocol. Ntuli (2012) conducted a study on the evaluation of maternal mortality in Limpopo Province and discovered that the Vhembe District had 24 321 deliveries and 49 maternal deaths. Eclampsia was the second leading cause of maternal mortality in 2012. Vhembe District was the second highest with maternal deaths, among the five districts of Limpopo Province.

The skill of diagnosing hypertensive disorders in pregnancy include the following: accurate blood pressure (BP) measurement where the woman should be seated with legs uncrossed for 2–3 minutes before BP is taken. The appropriate cuff should be used—medium or large cuff according to the size of the arm. The patient should be in a lying or sitting position with the arm at the level of the heart (Du Toit, 2013). BP is affected when the patient has not rested, i.e., when she is anxious, BP can be elevated. Right or supine position can lead to supine hypotension syndrome, hence left lateral position should be preferred. BP of 140/90 mmHg or more on 2 occasions

at least 4 hours apart need close monitoring. The mercury sphygmomanometer remains the gold standard for recording blood pressure in pregnancy, but because of the advancement of technology, an automated device is used.

The second diagnostic skill is urine testing (urinalysis) which should be done to check protein in urine and serve as a guide for further testing. The 24-hour urine specimen should be taken. The presence of 1+ proteinuria or more in dipstick testing, on catch urine specimen taken at least 4 hours apart requires close monitoring. The protein excretion >300mg in the 24-hour specimen of urine indicate the definitive test to diagnose proteinuria as the concentration of urinary protein in random urine samples is highly variable (Maputle *et al.*, 2015). Proteinuria is severe when there is protein excretion of at least 5 g per 24-hour period, these can indicate the sign of pre-eclampsia (Sibai, 2003)

Blood tests to be monitored to make a diagnosis are full blood count (FBC), urea, creatinine, electrolytes, uric acid, and liver function tests (LFT). These are basic blood investigations performed to check the degree of organ dysfunction that can indicate the risk of hypertensive disorder. The midwives should be able to interpret the results, in relation to the normal and abnormal range. Ranges differ according to age and gestational weeks. White blood cell counts range between 5.7–16 x 10^9/L, haemoglobin ranges between 10–14 g/dL, platelets ranges between 150–430 x10^9/L, creatinine ranges between 45–90 μmol/L, uric acid ranges between 30–48.6 mmol/L, bilirubin less than 20 μmol/L, lactate dehydrogenase ranges between 120–250 U/L (Queensland Clinical Guideline, 2016). During history taking, the midwife can ask the patient for the signs of severe pre-eclampsia that can be used to diagnose it. These include severe persistent headache, blurred vision, epigastric pain, hyperflexion, dizziness and vomiting which, if not attended to, can lead to generalised tonic-clonic seizures which are eclampsia (Department of Health, 2016).

Hypertensive disorders in pregnancy need special attention by midwives and patients because they reduce the blood flow to the placenta, which result in the limited supply of nutrients to the growing foetus (Stellenburg & Ngwekazi, 2016). The women at risk of developing hypertensive disorders include those who had high blood pressure before, under 20 and over the age of 40 years of age. Pregnant teenagers who are at school have a problem of not attending antenatal clinic in time and regularly, which in turn challenge the skills and knowledge of the midwife when complications arise. Adverse pregnancy outcomes include stillbirths, intrauterine growth restriction, and termination of pregnancy.

Sometimes midwives do not have control over the challenges that they face, e.g., when there is a shortage of resources which limits the display of their skills and knowledge which makes it difficult to arrive at a proper diagnosis. Midwives sometimes encounter some problems during monitoring a pregnant woman, like shortage of staff, inadequate or lack of instruments (blood pressure monitoring machines) and infrastructure. These could pose challenges in assessment, diagnosis, and treating such patients, which result in complications and even death.

1.3   Problem Statement

The researcher is presently working as a midwife in the maternity ward in one of the public hospitals in the Vhembe District. It has been observed with concern that women develop complications and die as a result of hypertensive disorders during childbirth. Ntuli (2012) stated that the maternal mortality rate per 100 000 live births was 201 when evaluation of maternal mortality initiatives was done. According to the National and District profiles of Limpopo Province, hypertensive disorders in pregnancy contribute to 11.5% of deaths in the Vhembe District, which indicates that there is a dire need for accurate intervention. The researcher further noted a scenario in one of

the institutions where a primigravida delivered a premature infant of 1.6 kg and needed kangaroo care. The mother was kept in the kangaroo care unit and after a week she developed seizures with normal blood pressure and was treated as an epileptic patient as hypertension was missed. After a day of not improving, urinalysis was done and 2+ of protein was found, she was transferred to a level 2 hospital where she was treated for hypertension and came back being stable. The patient was missed during pregnancy and it was only seen after delivery. The area of concern in this study was to investigate the knowledge and skills of midwives in diagnosing hypertensive disorders during pregnancy to treat early and prevent complications even after delivery (Brink, Van der Walt & Van Rensburg, 2017).

1.4   Purpose of the Study

The purpose of this study was to assess the knowledge and the skills of midwives regarding the diagnosis of hypertensive disorders in pregnancy in a selected hospital in Vhembe District, South Africa.

1.5   Objectives of the Study

The objectives of the study were to:

❈   Assess the knowledge of midwives in diagnosing hypertensive disorders in pregnancy.

❈   Determine the skills of midwives in diagnosing hypertensive disorders.

1.6   Research Question

The study was guided by the following research question:

What knowledge and skills do midwives have of diagnosing hypertensive disorders during pregnancy at selected facilities in Vhembe District, South Africa?

1.7   Significance of the Study

In this study, pregnant women and their families may benefit because hypertensive disorders will be diagnosed early and managed. The midwives will benefit because their knowledge and skills will be enhanced. The community at large may also benefit as maternal deaths will be reduced. The selected facilities would improve in rendering quality patient care. In this study, the result would bring awareness to the Department of Health about the gap that midwives encounter when executing their knowledge and skills in diagnosing hypertensive disorders in pregnancy and their needs for mechanisms to manage these challenges.

The findings of the study will also provide valuable information to policymakers to better design interventions that will meet the needs of the midwife, thus improving quality patient care. The findings and recommendations will also contribute to the body of knowledge, curriculum developers in the stream of midwifery, and form a basis from which further research can be conducted, locally, and nationally.

1.8   Theoretical Framework

Developing a framework for a study is one of the important steps in the research process. Grove, Gray & Burns (2015) defined framework as the abstract, logical structure of meaning that guides the development of a study and enable the researcher to link the findings to the body of knowledge. Downing & Yudkowsky (2009) cited Miller's pyramid as a useful model of the taxonomy of knowledge and skills concerning assessment in health profession education. Therefore, George Miller's *Four Stage Hierarchy of Competencies* was adapted to guide this study (Figure 1.1).

For midwives to acquire knowledge, they must be trained first, i.e., theory must be learned and then put into practice by demonstrating their skills in the clinical situation.
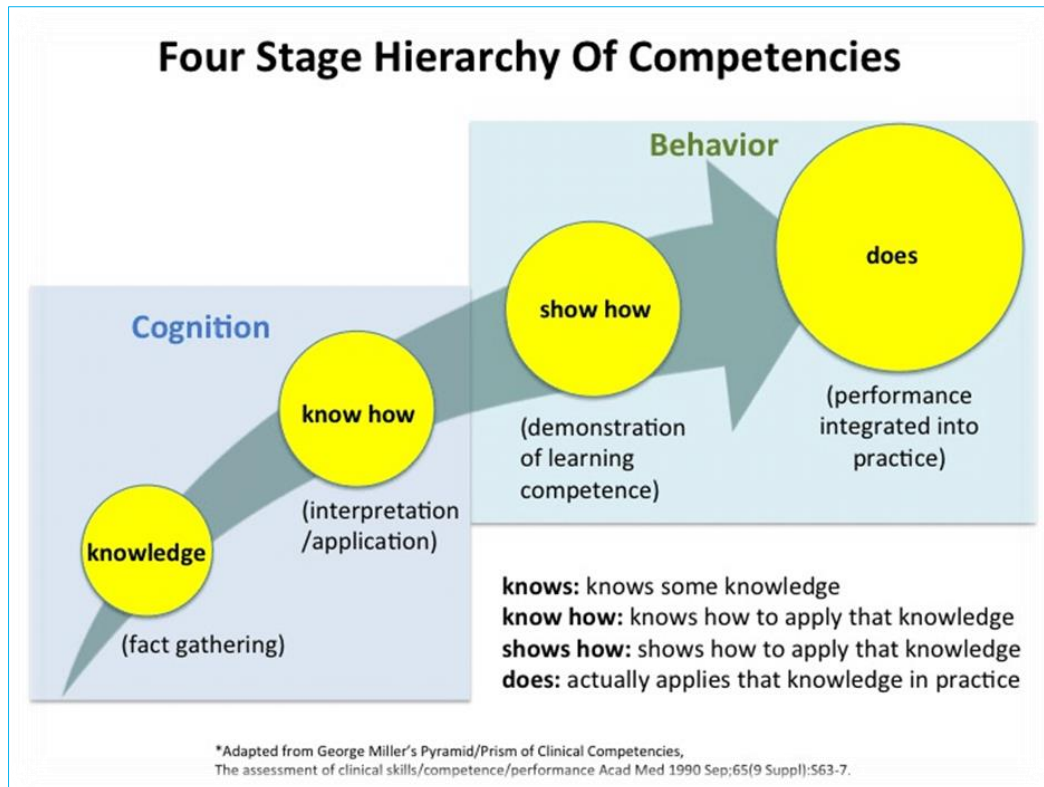
Figure 1.1: Goerge Miller's pyramid of clinical competencies (Downing & Yudkowsky, 2009)

In this study, Goerge Miller's pyramid was considered applicable as it deals with how midwives who acquire the knowledge through the four stages during which they will first gather the facts, and then be able to interpret and demonstrate learning competences. Goerge Miller's pyramid guided and assisted the researcher in developing the questions in assessing the knowledge and skills of midwives. The hierarchy of competencies is divided into two phases, cognitive and behaviour phase.

1.8.1 The Cognitive Phase

The cognitive phase consists of two sub-phases:

1.8.1.1 Knowledge

It is a stage of facts gathering that is part of their basic knowledge during their training to qualify as midwives. Midwives learn the theory and skills required for blood pressure measurement, assessment of pregnant women and anatomy, physiology, pathophysiology, and knowledge about hypertensive disorders.

1.8.1.2 Know-How

This is a phase where midwives have to interpret their assessment in history taking, to know how to measure normal blood pressure, to interpret results for urinalysis and blood tests, and be able to diagnose hypertensive disorders in pregnancy.

1.8.1.3 Behaviour

Behaviour consists of two phases: Show-How and Applies the Knowledge into Practice.

1.8.1.4 Show How

Show-how demonstration: midwives should be able to demonstrate how blood pressure measurement, urinalysis, and history taking are done.

❖ **Measuring Blood Pressure**

When measuring blood pressure, the woman should be seated for 2–3 minutes, appropriate size cuff should be used, which encircle 80% of the arm. Systolic blood pressure should be palpated at the brachial artery and the cuff be inflated to 20 mmHg above this level. The cuff is deflated slowly at proximately 2 mmHg per second, then BP is recorded. The *Society of Obstetricians and Gynecologists of Canada Clinical Practice Guideline* (2014) indicated that if automated blood pressure is used, it should be one that is validated for use in hypertension. Automated blood pressure machines

that have not been validated for use in women with hypertension may underestimate or overestimate blood pressure, it is recommended that there be a comparison of reading with the mercury sphygmomanometer. Urinalysis is done by dipstick testing on a catch urine specimen and should be a guide for further testing (Mark *et al.*, 2001).

❖ **Urinalysis**

In urine testing, the midwives should be able to demonstate the right way of collecting urine. The patient should be given a clean specimen container, advised to wipe the genital from front backward, and to take the midstream urine, midwives dip the uristic in the specimen container, drag the strip along the edge of the container, put it horizontally and wait approximately 2 minutes to read the results, and compare the uristic with that of the container (Bartal & Sibai, 2020).

❖ **History Taking**

In history taking, the midwives must be friendly and non-judgemental, and should ask obstetric history which include: current pregnancies details, past obstetric history, medical and surgical history, drug and allergies, family history like, multiple pregnancy, diabetes, hypertension, chromosome or congenital malformations and social history. The mode of delivery should also be discussed (Naz, 2012)

1.8.1.5 Does Performance Integrated into Practice

The midwives in practical situations must be able to assess and interpret the findings and treat to prevent complications. If blood pressure is not monitored well, urinalysis not tested correctly, and history taking not done accordingly, blood results will not be interpreted correctly and reported to the doctor, and the patient can be missed for immediate intervention and complicate to severe and imminent eclampsia. Likewise, failure to interpret the laboratory results implies that the patient cannot be treated for

organ or system failure. Adverse outcomes may include cerebral injury, acute renal failure, prematurity, and small for gestational age (Queensland Clinical Guidelines, 2016).

1.9 Definitions of Terms

1.9.1 Midwife

A midwife is a licensed person who is registered with the South African Nursing Council (SANC) based on completion of a recognised education and training programme to nurture, assist and treat the client, who can be a woman, a neonate, or a family member, in the process of promoting a healthy pregnancy, labour and postpartum period (SANC, 1984). In this study, a midwife is a nurse who is registered with the SANC as a registered midwife, and who can diagnose hypertensive disorders in pregnancy by using the knowledge and the skills acquired during training, and is able to interpret vital signs, treat and prevent complications by referring cases to higher level institutions.

1.9.2 Hypertensive Disorders

Hypertensive disorders are defined as one of the most common direct causes of maternal mortality, according to *Guidelines for Maternity Care in South Africa* (Department of Health, 2016). In this study, hypertensive disorders are defined as per these guidelines.

1.9.2.1 Chronic Hypertension

Chronic hypertension is hypertension that is present before 20 weeks of gestation or women taking anti-hypertensive drugs before pregnancy. In this study, chronic hypertension is elevated blood pressure that develops before pregnancy.

1.9.2.2 Gestational Hypertension

Gestational hypertension is defined as the new onset of hypertension presenting after 20 weeks of gestation without significant proteinuria. In this study, gestational hypertension is hypertension that presents because of pregnancy.

1.9.3 Pre-Eclampsia

Pre-eclampsia is a multi-organ disease of unknown aetiology with proteinuria after 20 weeks of gestation. In this study, pre-eclampsia is the presence of protein in urine with elevated BP.

1.9.4 Eclampsia

Eclampsia is the development of convulsion in a pre-existing pre-eclampsia. In this study, eclampsia is evident when a patient has fits or goes into a coma.

1.9.5 HELLP Syndrome

HELLP is a syndrome of haemolysis (**H**), elevated liver enzymes (**EL**), and low platelet count (**LP**). In this study, HELLP syndrome is the combination of haemolysis, elevated liver enzymes, and low platelets.

1.9.6 Knowledge

According to the English Oxford Dictionary (nd), knowledge is information and skills acquired through education or experience. In this study, knowledge is the information and knowledge obtained during training as a midwife, having information and skills in diagnosing hypertensive disorders during pregnancy by knowing how to measure blood pressure, able to do urinalysis, knowing which blood investigations are to be collected, and being able to interpret every finding to make a diagnosis from the findings.

1.9.7 Skills

Skill is the ability to do well, having enough ability, experience, and knowledge (Oxford English Dictionary, nd). In this study, skill is the ability of a midwife to do well, showing ability and being knowledgeable. In this study, the midwife is expected to display skills of diagnosing hypertensive disorders by being able to classify the hypertensive disorders after diagnosing and being able to know the condition that needs emergency care and referrals. In doing so, the midwives would be displaying their knowledge, experience, and ability to do well when nursing a pregnant woman with hypertensive disorders.

1.9.8 Diagnosis

Diagnosis, according to Oxford English Dictionary for Nurses (nd), is the name of a disease or condition that distinguishes it from other diseases or conditions based on physical examination and the patient's history. In this study, diagnosis is the art of determining the nature of disease using acquired skills. The midwive, as the primary contact of the pregnant woman before the doctor sees the patient, has a responsibility of making a nursing diagnosis with the findings from history taking, blood pressure measurement, urinalysis, blood test results, and the observation that was done during the examination of a patient. Oedema and puffy face are some of the features that can indicate the severity of the hypertensive disorders.

1.10 Research Design and Methodology

The study design was quantitative, descriptive, and explanatory where midwives' knowledge and skills were assessed in diagnosing hypertensive disorders during pregnancy at 8 selected facilities, and were all reached in Vhembe District, Limpopo Province. Midwives working in maternity wards in selected facilities were the target population. Data were collected using self-developed questionnaires after the

completion of voluntary consent forms by midwives. (Grove *et al.*,2015). The knowledge of hypertensive disorders, skills of diagnosing hypertensive disorders, nursing action taken by midwives, applying knowledge in practice, and the scope of midwives guided by the SANC was measured by choosing the correct answer and Yes or No statements. Data were analysed using SPSS version 25 with the assistance of a statistician. The findings were interpreted as percentages and frequencies and presented in the form of tables and graphs. The methodology is discussed in detail in Chapter 3.

1.11   Ethical Considerations

After receiving the ethical clearance certificate, permission was requested from the Department of Health, and applications were sent to the Chief Executive Officers and District Executive Managers of the selected hospitals. The subjects had the right to give voluntary informed consent, where they were informed about what was expected and the nature of the study. Other ethical considerations were included and are discussed in detail in Chapter 3.

1.12   Layout of the Chapters of the Study

Chapter 1:   Overview of the Study

Chapter 2:   Literature Review

Chapter 3:   Research Methodology

Chapter 4:   Presentation and Discussion of the Results

Chapter 5:   Summary, Limitations, Conclusions and Recommendations

1.13   Conclusion

In this chapter, the introduction and the background of the study were outlined, followed by the problem statement, study purpose, objectives, research question, and significance of the study. The theoretical framework was discussed in the context of the topic and what the researcher intended to study. The next chapter will cover the literature review.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

The previous chapter discussed the introduction and the background to the study, problem statement, purpose, objectives of the study and, research question, and significance of the study. The theoretical framework was also outlined. The whole plan for this research study was introduced. This chapter presents the literature review which is related to midwives' knowledge and skills with regard to hypertensive disorders and their classifications.

The literature review is an organized written presentation of what has been published on a topic by scholars. Review of literature entails analysis and synthesis of research sources to generate a picture of what is known and what is not known about a research problem. According to Brink *et al.* (2017), a literature review involves finding, reading understanding, and forming a conclusion about the published research and theory as well as presenting it in an organised manner. The purpose of literature review in quantitative research is conducted to direct the planning and execution of a study and convey to the reader what is currently known regarding the topic (Brink *et al.*, 2017).

This chapter presents a comprehensive overview of the literature in understanding midwives' knowledge of diagnosing hypertensive disorders during pregnancy. The researcher will concentrate on hypertensive disorders, complications of the hypertensive disorder, the role of the midwife, and the need to diagnose and the challenges related to achieving an accurate diagnosis.

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2.2   Hypertensive Disorders

Hypertensive disorders of pregnancy represent a group of conditions associated with high blood pressure during pregnancy, proteinuria, or convulsions in some cases (Dolea & AbouZahr, 2003). Braunthal & Brateanu (2019) defined hypertensive disorders of pregnancy as an umbrella term that includes pre-existing and gestational hypertension, pre-eclampsia and eclampsia that complicate up to 10% of pregnancies and represent a significant cause of maternal and perinatal morbidity and mortality. The *European Society of Cardiology* suggests that gestational hypertension should resolve within 42 days postpartum, which is the puerperal period, and that pre-existing hypertension persists beyond 12 weeks after delivery.

Hypertension itself has been defined over the years by diastolic or systolic readings alone, as well as by changes in pressures throughout pregnancy. Systematic reviews must compare studies or populations which are inferred to be the same, rather than the standardized *International Society of the Study of Hypertension in Pregnancy* (ISSHP) which identifies it as one of the factors for the range of controversies surrounding the treatment of hypertension during pregnancy. The committee was appointed in 1998 in reviewing various international guidelines, and hence, definitions are more standardized.

Discrepancies were still reported in their studies in sphygmomanometer intervals that define hypertension, precise definitions of proteinuria, and classification of hypertension. Braunthal & Brateanu (2019) concluded that all the above information indicates that the understanding of hypertensive disorders of pregnancy remains fluid and that further research is required before a universal consensus is reached on how to treat these disorders (Braunthal & Brateanu, 2019).

2.2.1 Cardiovascular Physiology

The hormonal changes of pregnancy induce significant adaptations in the cardiovascular physiology of the mother. It starts with the first trimester where there are surges of oestrogens and progesterone which lead to systematic vasodilatation. The rennin-angiotensin-aldosterone system is augmented to engender salt and water retention, leading to an expansion in plasma volume. The expansion in plasma blood volume results in physiologic anaemia relative to the rate of increase in red blood cell mass. The combination of elevated stroke volume and tachycardia leads to an increase in cardiac output during pregnancy, which compensates for the decline in vascular resistance to maintain blood pressure at high enough levels for maternal and placental perfusion (Braunthal & Brateanu, 2019).

2.2.2 Pathophysiology of Hypertension

Braunthal & Brateanu (2019) explained that any hypertensive disorder of pregnancy can result in pre-eclampsia—it occurs in up to 35% of women with gestational hypertension and up to 25% of those with chronic hypertension. The underlying pathophysiology of pre-eclampsia is not well understood, but it is thought to be related to a mechanism of reduced placental perfusion inducing systemic vascular endothelial dysfunction, which is due to a less effective cytotrophoblast invasion of the uterine spiral arteries.

Early-onset pre-eclampsia, occurring before 34 weeks of gestation is thought to be primarily caused by syncytiotrophoblast stress leading to poor placentation, and late-onset pre-eclampsia occurring at or after 34 weeks, is understood to be secondary to the placenta outgrowing its circulation. Early-onset of pre-eclampsia is more frequently associated with foetal growth restriction than late-onset, due to a longer duration of placental dysfunction. The pathophysiology of hypertension in pregnancy becomes

particularly relevant when reviewing the current state of adjunct therapies to antihypertensives that may help prevent pre-eclampsia (Braunthal & Brateanu, 2019).

2.2.3   The International Context

In 1996, the *International Society for the Study of Hypertension in Pregnancy* conceptualized terms that were approved and recommended, which involved conditions during pregnancy, labour, and the early postpartum period. *Gestational hypertension* includes hypertension or proteinuria that develops during pregnancy, after 20 weeks, or within 7 days postpartum and subside after delivery. The chronic hypertensive disorder includes *chronic hypertension* that pre-existed before pregnancy. Chronic hypertension is not as dangerous as gestational, but it does increase the risk for placental insufficiency, abruptio placentae, and superimposed pre-eclampsia and eclampsia (Gilbert & Harmon, 1993).

Dongue (2014) cited the WHO report that indicates that in Sub-Saharan Africa hypertension is associated with 16% of maternal deaths which are the leading cause of maternal deaths. The *South Australian Perinatal Guidelines* reported that 10–12% of pregnant women have developed hypertension during pregnancy which entails the essential detection and accurate measurement of blood pressure. In Indonesia, there are still a high number of women dying every year, 18 000, due to pregnancy, and the main causes of death being high-risk pregnancy and other conditions, including hypertensive disorders.

The *American College of Obstetricians and Gynaecologists* indicated that hypertensive disorders of pregnancy remain a major health issue for women and their infants in the United States, although appropriate prenatal care with the observation of women with signs of pre-eclampsia has reduced the number and extent of poor outcomes, serious maternal-foetal morbidity and mortality still occur. The results

indicated that it is a failure by health care providers to appreciate the multi-system nature of pre-eclampsia. Hence, midwives' knowledge is very critical.

Stellenberg & Ngwekazi (2016) reported that the maternal death rate in South Africa for the period 2011–2012, due to avoidable deaths of pregnant women, was accounting for 66.3% of avoidable deaths, of which hypertension contributed 16.5%—contributing factors included poor assessment, delays in referrals, failure to recognize the problem and not following standard protocols and poor monitoring. Their research was done in the South African region, the percentage of avoidable deaths due to hypertensive disorders during pregnancy, hypertensive disorder was 18.8. The aetiology is unknown.

In the past, several aetiologies have been suggested, but some have not withstood the test of time. Potential aetiologies include trophoblast invasion of uterine blood vessels where the trophoblastic tissues of the placenta fail to migrate down to maternal spiral arteries and displace muscular elastic structures of these arteries, generalised vasospasm leading to poor tissue perfusion and resulting in elevated blood pressure, immunological intolerance between fetoplacental and maternal tissues, maladaptation to the cardiovascular changes or inflammatory changes of pregnancy, dietary deficiency, and genetic abnormalities (Sibai, 2003).

Sibai (2003) indicated that approximately 70% of women diagnosed with hypertension during pregnancy will have gestational hypertension-pre-eclampsia, which is used to describe a wide spectrum of patients, who may have mild elevated BP with various organ dysfunction, including chronic hypertension, pre-eclampsia, eclampsia, and HELLP syndrome. Stellenburg & Ngwekazi (2016) further indicated that hypertension in pregnancy causes reduce blood flow to the placenta, which results in anoxia and a limited supply of nutrients to the growing foetus, leading to slow growth and premature

separation of the placenta from uterine walls causing severe bleeding. It results in the adverse outcome of the pregnancy, which is stillbirth, intrauterine death, intrauterine growth restriction, and termination of pregnancy.

Wiley (2015) indicated that the diagnosis and management of hypertension in pregnancy as well as obstetric disorders, sepsis, and safe abortion are guided in part by measurement of blood pressure. These conditions contribute to more than half of maternal deaths globally, which means that the accuracy of blood pressure measurement is important. Wiley (2015) cited Jason Waugh in his review, who indicated that the ability to measure blood pressure accurately is an indispensable skill for obstetricians, midwives, and other health care workers, regardless of settings to prevent maternal perinatal deaths worldwide. Early diagnosis is of utmost importance as it will improve the pregnancy outcome because better maternal and foetal monitoring would lead to earlier detection. Early detection and treatment of hypertension until foetal viability and timely delivery reduce death and morbidity from complications.

Stellenburg & Ngwekazi (2016) supported the early diagnosis of hypertensive disorders as it will identify any pathology. It can also improve the pregnancy outcome as better maternal and foetal monitoring would lead to earlier detection of clinical signs of the disease and treatment earlier. The very critical point that Stellenburg & Ngwekazi (2016) showed is that in South Africa, the majority of pregnancy-related care is delivered by midwives at the primary health care level. It also concerns the area of the study, Vhembe District, where most pregnant women are monitored by midwives at the primary level, where they will have only a visiting doctor on a specific day. Indeed, their knowledge and skills are very important to diagnose and treat hypertension at an early stage before any complication shows up.

Moodley *et al.* (2019) indicated the importance of knowledge and skills of health care providers by showing the action that they should take in nursing pregnant women with hypertensive disorders, which is to ensure that every health care professional that deals with pregnant women are familiar with the updated *Hypertensive Disorders in Pregnancy Management Guidelines*. Each clinic has appropriate protocols displayed prominently in clinics and labour wards and every health care professional is aware of the system of referral to the next level of expertise. The knowledge and skills of midwives cannot be ignored when nursing hypertensive disorders.

2.2.4 Classification of Hypertensive Disorders: According to Guidelines for Maternity Care in SA, Department of Health (2016)

The guidelines present the classification of hypertensive disorders as:

* ❄ **Chronic hypertension** is hypertension that is present before 20 weeks of gestation or if the woman was already taking antihypertensive medication before pregnancy.

* ❄ **Gestational hypertension** is a new onset of hypertension presenting only after 20 weeks of gestation without significant proteinuria.

* ❄ **Mild to moderate pre-eclampsia** is a diastolic BP of 90–109 mmHg and systolic BP of 140–159 mmHg with >1+ proteinuria.

* ❄ **Severe pre-eclampsia** is an acute severe hypertension diastolic BP of >110 mmHg and systolic BP greater than 160 mmHg with >1+ proteinuria.

* ❄ **Imminent eclampsia** is when some signs and symptoms are characterised by severe pre-eclampsia which are severe persistent headache, visual disturbances, epigastric pain, hyperreflexia, clonus,

dizziness, and fainting or vomiting.

❅   *HELLP syndrome* is the presence of haemolysis, elevated liver enzymes, and low platelets.

Midwives should be able to diagnose the abovementioned conditions by using the skills and knowledge they have acquired. Measurement of blood pressure is one of the diagnostic measures used by midwives. Magee, Pels, Helewa & Rey (2014) outlined the recommendations of measurement of BP. Midwives should know that: BP should be measured with the woman in the sitting position, with the arm at the level of the heart. An appropriately sized cuff should be used. If BP is consistently higher in one arm, the arm with the higher values should be used for all BP measurements. BP can be measured using a mercury sphygmomanometer or an automated BP machine that has been validated for use in pre-eclampsia. If the systolic BP>140 mmHg and diastolic BP of 90 mmHg, based on the average of at least two measurements, taken at least 15 minutes apart using the same arm can confirm the diagnosis of hypertension (Magee *et al.*, 2014).

Midwives should know that all pregnant women have to be assessed for proteinuria. Significant proteinuria should be suspected when urinary dipstick proteinuria is >1+ after 20 weeks gestation, during labour, and within 48 hours of delivery, that there is pre-eclampsia (Dolea & AbouZahr, 2003).

It can be shown again when gestational hypertension starts to have significant proteinuria the midwives should be able to do further investigations like collecting blood for laboratory tests to classify the severity of pre-eclampsia where there are signs of organ dysfunction, platelet of <100000/µL, creatine or liver enzymes more than double the normal values, neurological signs like persistent headache, visual

disturbances, and dizziness. All these signs can alert the midwives that there are severe pre-eclampsia and imminent eclampsia. Midwives should know that eclampsia which needs emergency care is characterised by generalised tonic-clonic seizures after 20 weeks of pregnancy and within 7 days after delivery associated with hypertension and proteinuria. In interpreting the blood results from the severe pre-eclamptic patient and imminent eclampsia, the presence of haemolysis, elevated liver enzymes, and low platelets, midwives should know that there is HELLP syndrome which will need the patient to be nursed in a tertiary institution with a high care unit. (Department of Health, 2016).

2.2.5   Complications of Hypertensive Disorders

The hypertensive disorders complicate and lead to cerebral haemorrhage and severe oedema, usually due to acute severe uncontrolled high blood pressure. Pulmonary oedema may be due to iatrogenic fluid overload. Severe pre-eclampsia complicates to abruption of the placenta and liver rupture. Renal impairment and acute renal failure may occur following delivery where fluid balance monitoring is very important. In case of severe pre-eclampsia, abruption of the placenta and liver rupture is likely to happen (Queensland Clinical Guidelines, 2016).

Hypertensive disorders complicate a pregnancy because it causes a reduction in blood flow to the placenta, which results in anoxia and a limited supply of nutrients to the growing foetus, leading to slow growth and premature separation of the placenta from the uterine walls, causing severe bleeding. The hypertensive disorder's outcome has a major influence on the neonatal outcome, which includes stillbirth, intrauterine death, intrauterine growth restriction and termination of pregnancy (Stellenburg & Ngwekazi, 2016). Early diagnosis is very critical to identify any pathology thus improving the pregnancy outcome.

Strategies designed in the Netherlands emphasise that the midwife is the primary contact who should manage all uncomplicated antenatal conditions without supervision and refer the complications to the next level. England also practices the same strategy (Stellenburg & Ngwekazi, 2016). In South Africa, *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) were introduce for all low-risk antenatal care to improve the quality of care during and after pregnancy. Midwives provide the care in primary health care and refer cases to hospitals where there are complications. Because of the role of a midwife in antenatal care facilities, the aim of the study has focused on midwives' knowledge in diagnosing hypertensive disorders.

2.2.6 Skills: Knowledge and Ability Required of Midwives to Prevent Complications

A study was done by Khosravi, Dabiran & Asnvandy (2014) on the prevalence of hypertension and complications of hypertensive disorders in pregnancy, concluded that pregnancy-induced hypertension is associated with multiple complications in the mother and baby, and particularly preterm delivery. Complications such as HELLP syndrome can sometimes prove fatal to the mother and foetus. The authors recommended that timely diagnosis and provision of specialized antenatal maternal care could reduce the impacts of such complications thus:

❋ Midwives should know a multidisciplinary team approach that includes communication with practitioners.

❋ They should know the approach referrals of high-risk women and subsequent follow-up to ensure specialist input.

❋ They must know how to use early warning tools to monitor for and monitor clinical deteriorations.

❋ Midwives should be able to make a priority in pregnant women with hypertensive disorders that are severe by seeing them first and be able to give necessary treatment according to the standing orders to keep the blood pressure under control.

❋ At the primary level where the doctor is not always available, they must know how to stabilize the pregnant women with the necessary drugs of choice, like giving Magnesium Sulphate and Aldomet in severe pre-eclampsia and imminent eclampsia before the transfer, that can minimise the risk of convulsions to the pregnant women.

❋ Midwives should assess all women for risk factors and consider risk reduction strategies, particularly if there was previously early onset of pre-eclampsia, underlying maternal disease like pre-existing diabetes, and renal autoimmune disease.

❋ Midwives should advise women at risk of hypertensive disorders of pregnancy of the symptoms of pre-eclampsia and seek immediate advice from health care professionals if they present with the following symptoms:

➢ Severe headache

➢ Blurring or flashing before the eyes

➢ Severe pain just below ribs on the right side

➢ Vomiting

➢ Sudden swelling of the face, hands, or feet

> ➤ The low dose of aspirin reduces the risk of pre-eclampsia (24%), preterm birth (14%), and intrauterine growth restriction (IUGR) (20%) in women at increased risk of pre-eclampsia without harmful effects. Midwives at the primary level should initiate these guidelines (Queensland Clinical Guidelines, 2016).

2.3   The Roles of a Midwife

A midwife is a person who is qualified and competent to independently practice midwifery in the manner and to the level prescribed and who can assume responsibility and accountability for such practice (Stellenburg & Ngwekazi, 2016). Midwives are responsible for ensuring that obstetric service provided is effective and efficient enough to bring a reduction of infant and maternal mortality rates. Du Toit (2013) in her research on the knowledge and skills of nurses in South Africa regarding the correct measurement of blood pressure, which is one of the assessments leading to the diagnosis of a hypertensive disorder, indicated that there seems to be limited information on their knowledge and skills regarding the correct measurement of blood pressure. Midwives remain the primary contact who should diagnose and manage all uncomplicated conditions in pregnancy and refer, through screening and assessment. To provide such a service, the knowledge and competence of midwives are critical. In diagnosing hypertensive disorders in pregnancy, the midwife should know the following:

2.3.1   The Need to Make a Diagnosis

Diagnosis by midwives is needed as at the primary level where they are working independently, i.e., where they assess, make a diagnose, treat where there are no complications and refer the complicated cases. Diagnosis is very critical in nursing, for nurses and doctors because the patient has so much to lose when there is a

misdiagnosis, and can result in the patient being denied timely and effective treatment. In this study, classification is needed in order to give the relevant treatment and make priority in attending to the emergencies. It is important to know what disease you have so that they know what to expect, what to watch out for and what they can do about it (Wen, 2013).

To have a proper diagnosis helps the midwives to classify the patients accordingly. Brown, Lindhemier, de Swiet, Assche & Moutquin (2001) and the Queensland Guidelines (2015) indicated that the literature relating to classification of hypertensive disorders in pregnancy and diagnostic definitions of each hypertensive category has been and remains confusing to clinicians and investigators. The council of the ISSHP appointed a committee to consider these issues where recommendations were made at the 12th World Congress in Paris. The council took notice of the importance of specificity in the diagnosis. Management, treatment and counselling that will follow after a specific diagnosis will be relevant to the patient (Brown *et al.*, 2001; Queensland Clinical Guidelines, 2015).

Diagnosis always channel the health workers how to treat and manage the patient according to the developed protocols. If a patient is diagnosed with pre-eclampsia where there are signs of imminent eclampsia, midwives should know that patient needs urgent admission and management at the secondary institution. During antenatal clinic visit, the goal is for the midwives to come with diagnosis of hypertension in pregnancy, then include control of BP, recognise pre-eclampsia early, prevent it and optimise birth for both the woman and her baby. When diagnosis is accurate and made in a timely manner, a patient has the best opportunity for a positive health outcome (Queensland Clinical Guidelines, 2015).

2.3.2   History Taking

The *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) outline the format of history taking which every midwife should follow when taking a history from a pregnant woman. A midwife should take a full and relevant history asking about the current history, where midwives should be able to ask about the patients' complaint, the present health status of women, if she is having other conditions like diabetes mellitus, and renal failure, because these can contribute to hypertensive disorders in pregnancy. The onset of signs and symptoms (increased blood pressure, oedema, headache, and blurred vision) can assist in making a diagnosis at the end of history taking and assessment.

❖ **Previous Pregnancies**

Midwives should be able to assess by asking for previous pregnancies if the women had pregnancy-induced hypertension, these will help in diagnosing because those who had high BP with the previous pregnancies are likely to have with the coming pregnancies. For midwives to come up with the diagnosis from the previous history, they can ask the duration, age of onset, and previous levels of BP, family history can also assist because hypertension can be hereditary. Lifestyle (exercise, salt intake, smoking) can be contributory factors for hypertensive disorders if a woman does not constantly guard against them. A family history of hypertension is the most dominant risk factor for pre-eclampsia in pregnant women. Early diagnosis will be very important if they can seek health assistance early (Endeshaw, Abebe, Bedimo, Asrat, Gebeyehu & Keno, 2016).

History-taking will assist the midwife with the provision of information on pregnant women and further facilitate arriving at the diagnosis of the pregnant woman. In showing the knowledge that a midwife must have concerning hypertensive disorders

as above, there are challenges, according to Bilkan, Gilbert & Ryan (2014), they stated that there has been an international move away from the use of mercury sphygmomanometer and this has led to the widespread use of automated blood pressure devices, many of which have not been validated for use in pregnancy. Midwives are no longer familiar with the old devices for blood pressure monitoring. It further indicates that there has been growing recognition of the potential inaccuracies in the measurement of proteinuria and of the potential for severe maternal complications in pregnancies by *de novo* hypertension, as hypertension in pregnancy includes the spectrum of conditions most notably pre-eclampsia, a form of hypertension unique to pregnancy that occurs de novo or may be superimposed on chronic hypertension (Brown & Garovic, 2011).

Potter (2010) indicated that history taking in pregnant women involves asking a question relevant to the patient's current and previous pregnancies, but some questions are highly personal and therefore good communication skills and a respectful manner are essential. He further indicates that a midwife should ask a lot of questions that are not part of the standard history taking format, it is important to understand what information midwives are expected to gain.

❖ **Key Symptoms to Ask About:**

  ❋　　　Nausea and vomiting

  ❋　　　Reduced foetal movement (foetal distress)

  ❋　　　Vaginal bleeding (urinary tract infection, placenta praevia)

  ❋　　　Abdominal pains (constipation, placental abruption)

  ❋　　　Headache/visual disturbances/epigastric pain (pre-eclampsia)

The above symptoms can assist midwives to categorise or classify the hypertensive disorders according to their severity if it is accompanied by elevated blood pressure and proteinuria. In asking about the placental abruption, it is because pre-eclampsia and placental abruption may share a common pathophysiology that is uteroplacental ischaemia. Pre-eclampsia is one of the conditions that constitutes the syndrome of ischsemic placental disease group of pathologies that also include placental abruption and intrauterine growth restriction. A common aetiology involving poor placentation in early pregnancy has been proposed as an underlying mechanism leading to the characteristics of uteroplacental underperfusion obstetrical complications (Parker, Werler & Ananth, 2016)

Asking about headache, visual disturbance, and epigastric pains are all signs of imminent eclampsia where the midwives will be able to classify the severity of the hypertensive disorders and these signs will make them cautious when monitoring pregnant women with elevated blood pressure. Some patients can present with these symptoms and have normal blood pressure, but still caution should be taken and further investigations need to be done to get the proper diagnosis and not miss the pregnant woman. The midwife will summarize what she has received from the patient and ask more if need be for her to come with her nursing diagnosis.

2.3.3 Blood Pressure Monitoring

South Australian Perinatal Practice Guidelines (Department of Health, Government of South Australia) indicated that 10–12% of pregnant women have or develop hypertension during pregnancy—detection and accurate measurement of blood pressure is thus important. *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) indicated that increases in BP levels of >30 mmHg systolic and rise in diastolic of more than 15 mmHg over BP values taken at the first booking visit may

indicate the development of hypertension even if the blood pressure is not yet in the hypertensive range.

2.3.4 Recommended Procedures for Measuring Blood Pressure

The hypertensive disorder guideline referred to in (Moodley *et al.*2019) showed that the standard protocol for measuring blood pressure is to use machines validated for use in pregnancy and ensure the provision of sufficient functional BP machines. The accurate skill for blood pressure measurement is that the woman should be seated with legs uncrossed for 2–3 minutes before BP is taken. The appropriate cuff should be used, medium and large cuff according to the size of the arm. Cuff length should be 1.5 times the circumference of the arm. If arm circumference is greater than 33 cm, a larger cuff must be used. The patient should be in a lying or sitting position with an arm supported horizontally at the level of the heart and feet supported on the flat surface. Du Toit (2013) indicated that BP is affected when the patient has not rested, when she is anxious, BP can be elevated. Right or supine position can lead to supine hypotension syndrome. Blood pressure of 140/90 mmHg or more on 2 occasions at least 4 hours apart need close monitoring. The mercury sphygmomanometer remains the gold standard for recording blood pressure in pregnancy, but because of the advancement of technology, an automated device is used. Blood pressure control during pregnancy is crucial for the safety of both mothers and babies (Stellenburg & Ngwekazi, 2016).

2.3.5 Misdiagnosis by Blood Pressure Measurements

Midwives can miss pregnant women if BP is not measured in antenatal visits. Some facilities often report that they do not have BP machines, which can make it easy to miss hypertension in pregnancy. The position used can contribute to BP readings, supine BP may be elevated late in pregnancy in some women due to the mass effect

of the gravid uterus. This has made many clinicians prefer BP measurement in the left lateral decubitus position. When BP is recorded from the right arm (inadvertently elevated relative to the heart), it can be falsely reassuring. When measuring blood pressure, both feet need to rest on the ground or a stool. The back needs to be supported, as well as the arm, which should be propped at heart level.

❖ **Common Mistakes That Can Be Made:**

　❈　Failing to rest before measurement. Sitting quietly for about five minutes can help relax the body.

　❈　Placing cuff over clothing. Depending on the thickness of the sleeve, clothing can add up to 50 mmHg to a reading.

　❈　Using the wrong sized cuff. Squeezing an arm into a cuff that is too small can add up to 2–10 mmHg to a measurement

　❈　Engaging in conversation. The small talk must be avoided during BP measurement.

The *Queensland Clinical Guideline* (2016) outlines the BP measurement by showing that when the woman is in labour, the left arm can be used in lateral recumbency to avoid supine hypotension syndrome. If BP is consistently higher in one arm, use the arm with higher values for all BP measures.

❖ **Midwives Should Consider Factors That Can Affect Blood Pressure Readings:**

　❈　Stress and anxiety

　❈　Talking while taking blood pressure

❋   Tobacco products (containing nicotine) can increase BP

❋   Alcohol/caffeine should be avoided 30 minutes before measurement

❋   Full bladder

Stress is a factor that is often associated with blood pressure elevation. Alberto (2015) indicated that copeptin and vasopressin-related stress hormone were measured in a large cohort of over 2000 healthy young adults, and found plasma levels of copeptin were significantly associated with an increased blood pressure variability in both sexes. Associations of either foetal growth restriction or prematurity with elevated blood pressure in adult life have been further investigated and the results indicate that follow-up that was made in 1756 individuals showed that elevated blood pressure levels associated with prematurity are more likely to be present in those with foetal growth restriction. Midwives have to assess if pregnant women are stressed, more especially the teenagers and those who had an unwanted pregnancy, and where need be those pregnant women can be referred to the psychologist to resolve the issues of stress and only deal with the hypertensive disorders (Alberto, 2015).

Cigarette smoking during pregnancy is known to increase the risk of several adverse outcomes such as foetal growth restriction and preterm birth. Wikstrom, Stephansson & Cnattingius (2010) compared the effects of Swedish snuff and cigarette smoking on pre-eclampsia risk and estimated whether changes in tobacco habits during pregnancy affected the risk of developing term pre-eclampsia. Their findings showed that both snuff and cigarette smoke were associated with abnormal placentation and that some common ingredients such as nicotine may affect placentation. In the development of pre-eclampsia, nicotine may affect the first stage of placentation, but not the second stage, the development of the clinical disease. The risk of those who

use snuff developed pre-eclampsia with placental involvement, which resulted in preterm and stillbirth. Smokers are at risk of being exposed to nicotine and to products of combustion, which inhibit the release of oxygen into foetal tissues (Wikstrom *et al.*, 2010).

The role of midwives in diagnosing hypertensive disorders is to have knowledge of these risk factors and be able to communicate to the pregnant women by giving them health education in each antenatal visit or handouts to the literate to reduce the complications that can be avoided. During history taking it is very critical to ask the social history of a pregnant woman as it will assist with the proper diagnosis, because some lifestyle factors like smoking can contribute to elevated BP in pregnant women and render the treatment ineffective and patients not to respond well.

Alcohol can also affect BP as it contains lots of calories and sugars which contribute to increased body fat, weight gain, and poor diet. Freeland (2019) in her study whether alcohol is good or bad for high BP and heart health indicated that the direct effects of alcohol on BP are related to the way alcohol is processed through the body. Having three more drinks at once can temporarily raise BP, but once it is processed out of the body, BP can stabilize to normal. Binge drinking, i.e., having four or more drinks in women in two hours, can cause a temporary spike in BP. And if binge turns into long-term excess it may lead to chronic hypertension. The study indicated that scientists are still learning exactly how it happens, but what it is known now is that alcohol can raise BP directly and indirectly (Freeland, 2019). Midwives should be able to explain these dangers to pregnant women and to assess them before measuring blood pressure, the state of women who takes alcohol, the last time they took alcohol, to end up with the correct diagnosis and avoid giving treatment unnecessarily.

2.3.6   Urine Testing

Proteinuria is a consequence of two mechanisms: the abnormal transglomerular passage of protein due to increased permeability of the glomerular capillary wall and their subsequent impaired reabsorption by the epithelial cells of the proximal tubule. Two major mechanisms are responsible for the abnormal urinary excretion of proteins that characterizes all glomerular diseases, with or without nephrotic syndrome: increased charge and size permeability of the glomerular capillary wall, leading to the transglomerular passage of albumin and proteins and the consequent impairment of the mechanism of reabsorption of all proteins, in particular, the low-molecular–weight proteins by the epithelial cells of the proximal tubule due to increased work and toxic injury deriving from the increased load of abnormally filtered proteins in the tubular lumen (D'Amico & Bazzi, 2003; De Ballefonds, 2019a).

During pregnancy, the most common test that is done is the qualitative and quantitative measurement of urine. According to Sibai & Bartal (2020), proteinuria was necessary for the diagnosis of pre-eclampsia, but recent guidelines recommend that proteinuria is sufficient, but not necessary for the diagnosis, and urine dipstick screening which is supposed to be done by midwives in their assessment, should not be used to diagnose proteinuria. The classic cut-off cited to define proteinuria during pregnancy is a value of >300 mg/24 hours or a urine protein-to-creatinine ratio of at least 0.3. The most important factor that influences maternal and neonatal outcome is the severity of blood pressure and end-organ damage rather than the excess protein excretion.

Urine testing should be done to check protein in urine and as a guide for further testing, a 24-hour urine specimen should be taken. The presence of 1+ proteinuria or more in dipstick testing, on catch urine specimen taken at least 4 hours apart requires close

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monitoring. Quantitative and qualitative measurements of urine protein excretion is one of the most common tests performed during pregnancy. Protein excretion >300 mg in the 24-hour specimen of urine was previously outlined (Maputle *et al.*, 2015). This will be the definitive test to diagnose proteinuria as the concentration of urinary protein in random urine samples is highly variable. Proteinuria is severe when there is protein excretion of at least 5 g per 24-hour period, these can indicate pre-eclampsia as reported by Sibai (2003). Proteinuria testing does not need to be repeated once significant proteinuria in the setting of confirmed pre-eclampsia has been detected.

Midwives should be able to do urine dipstick testing by filling a clean specimen container with mid-stream urine. Patients are advised to wipe their private parts from front to back. Dip the test strip into the urine and let urine drip off the side of the strip, not down its length. Turn the stip sideways before reading and it should be held in a horizontal position. Wait approximately 2 minutes for the results. Bearing in mind that they have to collect 24-hour urine specimen as baseline protein excretion is critical in certain in conditions such as pre-eclampsia or women with chronic hypertension or diabetes will experience a different normal pattern of protein excretion during pregnancy. When screening pregnant women, the midwives must consider other conditions that can bring the wrong diagnosis if other conditions are not screened, like renal disorders (Bartal & Sibai, 2020).

2.3.7 Blood Tests to Be Done

Blood tests to be monitored to make a diagnosis are full blood count (FBC), urea, creatinine, electrolytes, uric acid, and liver function tests (LFT) (Table 2.1). These are basic blood investigations done to check the degree of the organ dysfunction that can indicate the risk and complications of the hypertensive disorder, which are severe pre-eclampsia which will be seen by platelets of <100000/µL, which can also suggest

immune thrombocytopaenic purpura. Haemoglobin levels greater than 13 g/dL suggest haemoconcentration. Low levels may be due to macroangiopathic haemolysis or iron deficiency. These can be accompanied by neurological signs like persistent headache, visual disturbances, and dizziness, which can indicate severe pre-eclampsia.

Table 2.1: Interpretation of pre-eclampsia investigation outlined by Queensland Clinical Guideline (2016)

Parameter	Gestation (weeks)	Reference range	Units	Description, if pre-eclampsia
White blood count	1–12	5.7–13.6	$X10^9/L$	**Higher** Largely due to exaggerated neutrophilia
	13–24	6.2–14.8		
	25–42	5.9–16.9		
	Greater than 42	5.7–16.9		
Haemoglobin	1–12	110–143	g/L	**Higher** Due to haemo-concentration unless there is microangiopathic haemolytic anaemia
	13–24	100–137		
	25–42	98–137		
	Greater than 42	98–143		
Platelets	1–12	170–390	$x10^9/L$	**Lower** Less than 100×10^9/L may be associated with coagulation abnormalities. Falling platelet count associated with worsening disease
	13–24	170–410		
	25–42	150–430		
	Greater than 42	150–430		
AST	0–42	Less than 31	U/L	**Higher**
ALT	0–42	Less than 34	U/L	**Higher**
LDH	0–42	120–250	U/L	**Higher**
Random protein to creatinine ratio	0–42	Less than 30	mg/mmol	**Higher**

Midwives should be able to interpret the results, the normal and abnormal range. Ranges differ according to age and gestational weeks: White blood cell ranges

between 5.7–16.9 x 10^9/L, haemoglobin ranges between 10–14 g/dL, platelets range between 150–430 x 10^9/L, creatinine ranges between 45–90 µmol/L, uric acid ranges between 30–48.6 mmol/L, bilirubin less than 20 µmol/L, lactate dehydrogenase ranges between 120–250 U/L. These can assist in diagnosing pre-eclampsia, when the platelet count is less than 100 x 10^9/L, haemolysis when red cell fragments appear on blood film, raised bilirubin, serum or creatinine greater or equal to 90 µmol/L and raised transaminases. The organs and systems affected are renal where it shows by oliguria and plasma creatinine greater than or equal to 90 µmol/L.

Midwives should be able to interpret the results of a patient to make the correct diagnoses and intervene in a correct way concerning treatment, referrals, and using protocols as given by the Department of Health. Identifying and noting the signs and symptoms of severe pre-eclampsia that can be used to diagnose may include severe persistent headache, blurred vision, epigastric pain, hyper-flexion, dizziness, and vomiting, which, if not attended to, can result in the patient to suffer generalised tonic-clonic seizures which is eclampsia as indicated in Guideline for Maternity Care in SA (Department of Health, 2016). Midwives should be able to interpret the blood test results so that they can act as quickly as possible to prevent further complications.

2.3.8 Diagnosing Skills by Midwives

Midwives are expected to display certain skills in order to be able to come up with a proper diagnosis. Interpersonal skills are needed in order to gain the cooperation of the patient. During history taking, for the midwives to gather information, a good relationship must be established with the patient. Good listening skills are essential, and good communication skills are needed for midwives and the part of communication that sometimes takes a back seat is listening, this will help the midwife to have a better understanding of the needs of the patients and also helps to build

rapport (Global Pre-med, 2014). Problem-solving skills are very important because midwives may encounter different situations and problems which require a straightforward solution and sometimes to think outside the box. Problem-solving skills require the midwife to use the clinical knowledge and examine the situation objectively. Good judgement is important as pregnancy does not always go as it should. Good judgement can mean knowing when to seek help, seeking additional assistance and referring a patient. The midwife should be able to teach, because pregnant woman and their partners may need education on ways to stay healthy, to be aware of complications and nutritional recommendations. The midwives need to work well under pressure by being calm when circumstances change and emergencies develop, and that will help them to also calm the patient. With all the responsibilities midwives have, they need to be confident in their abilities (Global Pre-med, 2014).

2.4 Challenges Midwives Face When Diagnosing Hypertensive Disorders

Guidelines for Maternity Care in South Africa (Department of Health, 2016) outlines the importance of staffing, where midwives, advanced midwives, enrolled nurses, nursing assistants, full-time medical officers, and visiting specialists are needed. All necessary equipment should run properly in the facilities. There is still a shortage of staff in most of the hospitals in the Vhembe District where the workload is more than the staff. As the community is growing, teenage pregnancy escalating and people from outside the country are increasing, staff become overloaded. The study by Ramavhoya, Maputle, Lebese & Ramathuba (2019) in managing hypertensive disorders during pregnancy in low resource settings indicated that shortage of midwives was found to be a barrier that hindered them from implementing what they know, not necessary that they do not know. In their reports, midwives do not correlate with the number of pregnant women on a daily basis.

2.4.1 Emergency Transport

Guidelines for Maternity Care in South Africa (Department of Health, 2016) indicated that appropriately staffed and equipped obstetric ambulances should be available 24 hours a day in all health districts to move women from one health facility to another. There is a challenge when there is an emergency because of shortage of ambulances.

2.4.2 Shortage of Equipment

Thopola (2015) conducted a study on challenges experienced by midwifery practitioners in the midwifery practice environment in Limpopo Province. The researcher outlined the shortage of midwifery practitioners, insufficient material resources, and scarcity of essential equipment. The results indicated that there is an inadequate number of midwifery practitioners versus the increased number of pregnant women expected to be monitored. Thus, midwifery practitioners become exhausted due to workloads. These challenges impeded the use of adequate human and material resources and equipment which were beyond the midwives' control. For example, shortage of blood pressure machines at the clinic. All of the above can contribute negatively to diagnosing hypertensive disorders where staff ratio is not corresponding to the number of patients seen, it brings an abnormal workload to the midwives and they can miss even the important things when dealing with hypertension in pregnant women. Burnout syndrome that occurs because of workload can interfere with midwives doing well at work.

2.5 Conclusion

This chapter provided an overview of hypertensive disorders, their pathophysiology, and the classification according to their severity. The complications that result because of these conditions were outlined. The midwives as the primary source of making the diagnosis, their role, and the knowledge that is needed from them to

come up with a proper diagnosis were described. The responsibility and the challenges that midwives encounter when the nursing hypertensive patients was outlined. The next chapter will describe the methodology used in this research study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Chapter 2 reviewed the literature related to hypertensive disorders, how to detect them, and their classification according to their severity and complications. This chapter will describe the research methodology, study design, study settings, population and sampling, measurement instrument, pre-test, validity and reliability, plan for data collection, data management and analysis, ethical considerations, and plans for dissemination and implementation of the results.

3.2 Research Methodology

According to Welman, Kruger & Mitchell (2014), research methodology refers to methods, techniques and procedures that are employed in the process of implementation of the research plan. Brink *et al.* (2017) explained research methodology as the exposition that informs the reader how the investigation was carried out, what the researcher did to solve the research problem or answer the research questions.

3.3 Study Design

Research design is a master plan which specifies the methods and procedures for collecting and analysing the needed information. Adams, Khan, Robert & White (2007) indicated that research design is like building a house where the idea will come in and in exchanging that idea with others, a plan will arise for the type of house needed.

This study employed quantitative, descriptive, and explanatory research which correlates with the research objective and the purpose of the study.

3.4   Quantitative Approach

A quantitative approach has been adopted, which is a formal, objective, and systematic process. It is conducted to describe and examine relationships, identify problems with current practice and make judgments about the practice. The researcher has examined the relationship between the knowledge and skills of midwives and the diagnosis of hypertensive disorders (Grove *et al.*, 2015). A quantitative approach was chosen, and it helped the researcher to examine relationships among variables and generalise the findings as it is deductive. The researcher assessed midwives' knowledge and skills in diagnosing hypertensive disorders in pregnancy. The researcher has adhered to the process of standardized methodological procedures, where questionnaires have been used to collect data. The researcher remained detached from the study which makes it to be objective and reduced bias as midwives were to answer questionnaires on their own without the researcher being there (Grove *et al.*,2015). The outcome includes the description of concepts, the relationship between the concepts of knowledge, skills, and diagnosis of hypertensive disorders.

3.5   Descriptive Research

The aim was to identify the nature of nursing phenomena and their relationships. Descriptive research assists the researcher to conduct research with a large number of study respondents in their natural settings with no manipulation. Brink *et al.* (2017) emphasised that descriptive designs are concerned with the gathering of information from a representative sample of the population based on structured observation and questionnaires, and this was what the researcher did. The outcome was the

identification of possible relationships among concepts and description of concepts.

3.6 Explanatory Research

Explanatory research clarifies the relationships among phenomena and identifies the possible reason why certain events occur. It further elucidates why there is a relationship between two or more aspects of a situation. In this study, the purpose was to link assessment data to diagnosis, where midwives' knowledge was assessed for them to come up with the early diagnosis of hypertensive disorders in their working situation. The outcome was that the midwives were assessed on their knowledge and skills by answering the items that constituted the administered questionnaires.

3.7 Study Setting

The study has been conducted in selected hospitals and health centres in Vhembe District which is situated in the northern part of Limpopo Province and shares borders with Capricorn and Mopani districts in the eastern and western directions, respectively. The district covers 21 407 square km of the land with a total population of 1 294 722 people, according to Statistics SA (2011). Vhembe District consists of four local municipalities: Musina, Collins Chabane, Thulamela, and Makhado (Figure 3.1).

The health status of the area: The health care services are provided by the Ministry of Health; government provides free public health services. There is one referral hospital, seven district hospitals, and 88 Primary Health Care (PHC) centres of which 17 operate 24 hours, provide services at the primary level, treating uncomplicated ailments. Maternal health services are also available at the primary level. The health care system around Vhembe District has improved in recent years. Every community has clinics, nearby hospitals, and mobile clinics where the community receives care.
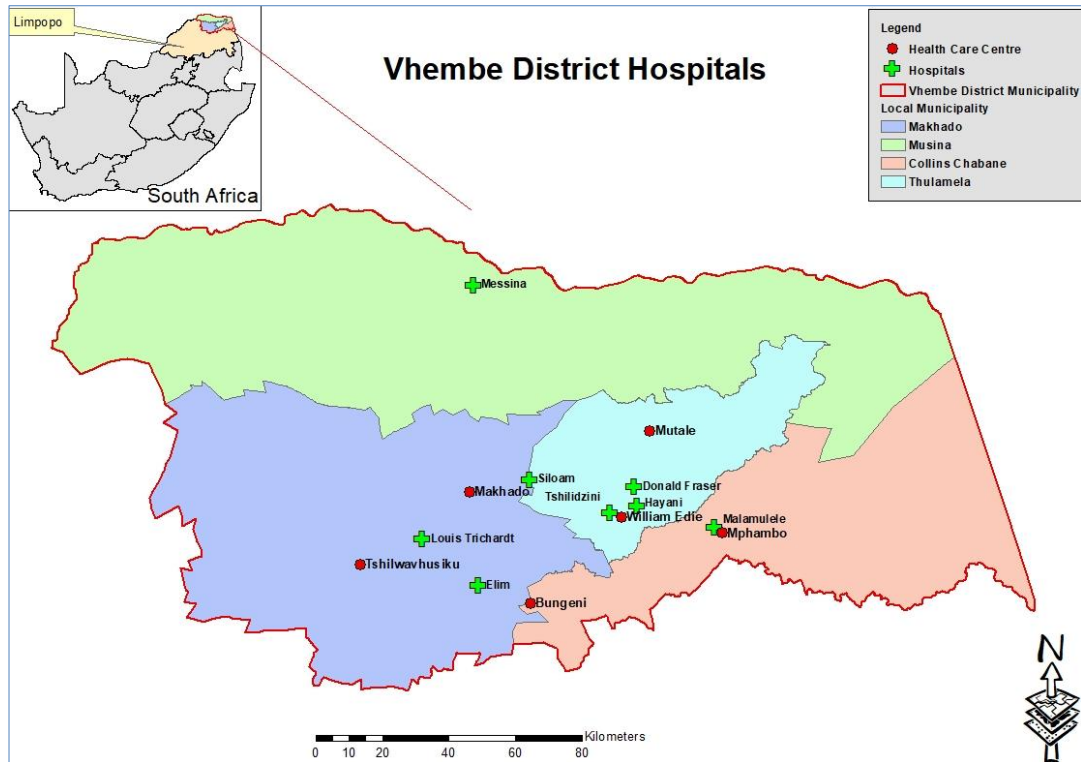
Figure 3.1: Vhembe District Map (Municipal Demarcation Board, 2016 and Community Survey 2016)

Since hypertensive disorders during pregnancy are a health concern, the community has access to clinics and hospitals with free transport by emergency medical services. Hypertensive disorders are the most direct causes of maternal mortality and are responsible for significant perinatal and maternal morbidity. Hypertensive disorders during pregnancy are common in the district because the 2013/14 report indicated the number of maternal deaths as 36, and the cause being hypertensive disorder in pregnancy (District Health Plan, 2015/16). Early detection and timely intervention are therefore important to prevent maternal and perinatal complications. The causes of hypertensive disorders remain unknown, but efforts are underway to overcome this obstacle, e.g., by treatment and timely delivery which will reduce death (Department of Health, 2016).

3.8   Population and Sampling

3.8.1   Target Population

According to Brink *et al.* (2017), a target population is the entire group of persons that meets the criteria that the researcher is interested in studying. The researcher was interested in determining the knowledge and skills midwives use in diagnosing hypertensive disorders in pregnancy. Midwives were the entire set of elements that the researcher would like to generalize and they were thus the objects of interest of the research study. The population of the study was all midwives who were working in maternity wards in both health centres, hospitals and all selected facilities in Vhembe District, South Africa (Figure 3.1). Midwives and advanced midwives of all ages with six months experience and above in the maternity ward were selected. According to the Personnel Administration System (PERSAL) and the District Health Information System (DHIS) (https://www.hst.org.za/publications), the human resources component for Vhembe District with regard to filled posts in 2016 comprised 2 828 professional nurses with midwifery and general professional nurses.

3.8.2   Sample and Sampling

A sample is the subset of the population that is selected for investigation. Sampling was done in two phases: *firstly*, the hospitals and health centres. Names of hospitals and health centres (Table 3.1) with a high number of admissions and consultations of pregnant women have been sampled for the study; *secondly*, midwives who were providing care to these pregnant women. A sampling guideline by Stocker cited by De Vos *et al.* (2011) was used to sample hospitals, wherein systematic sampling was used to select midwives in the designated facilities. Midwives were sampled using interval sampling after obtaining the list of total population according to the above guideline (Table 3.1). The researcher's sample size was 77. The sampling interval (K) =size of population/size of the sample=N/n. 194/77=2.5 which was rounded to 3. A

number between 1 and 194 was randomly selected. The interval was 3 until 77 midwives were selected (De Vos *et al.*, 2011).

Table 3.1: Sampling guideline by Stocker cited by (De Vos *et al.*, 2011)

Facilities	Estimated number of midwives	Number sampled	Percentage
Tshilidzini	67	67	100%
Elim	30	30	100%
Malamulele	22	22	100%
Louis Trichardt	18	18	100%
Bungeni	16	16	100%
Tshilwavhusiku	14	14	100%
Mphambo	11	11	100%
Makhado	16	16	100%
Total	**194**	**194**	**100%**

3.8.3   Inclusion Criteria

Inclusion sampling criteria are those characteristics that an element must possess to be part of the target population. All midwives who possess all the necessary skills of providing care to pregnant women and working in the maternity ward of selected health centres and hospitals were included to consent for the study. Community service midwives were excluded. Midwives and advanced midwives, both males and females from newly qualified to the most experienced midwives were included. Newly qualified midwives were included because the four-year course enable them to gain experience during community service for one year and the general midwives gain experience while waiting for their results (Grove *et al.*,2015).

3.8.4   Sample Size

The sample size is the number of respondents that are examined in research (Burns

& Grove, 2011). In this study, the sample size comprised of a total of 77 respondents (n=77), the researcher has decided on systematic sampling, where all midwives from selected facilities had equal chance of being selected.

3.9   Measurement Instrument

Measurement is the process of assigning numbers to objects or situations in accord with some rule and an instrument is a measurement device selected to measure each variable in a study (Burns & Groove, 2005). In this study, questionnaires and an observational checklist were used to collect data. Self-report questionnaires were used to measure variables and information of interest. The questionnaire comprised closed-ended questions because it increases the reliability of the response, bias is reduced, and it is time-efficient, easy to code and interpret. The researcher was responsible for the observational checklist where midwives were observed while taking vital signs of the patients. The researcher conducted the literature review and referred to a previously approved questionnaire to develop one. English was used as the medium of instruction when developing questionnaires, as the respondents were all literate. The questionnaire consisted of sections that followed the hierarchy of the theoretical framework:

Section A: Biographical information

Section B: Knowledge about hypertension (contributory causes, classification of hypertensive disorders, prevention)

Section C: *(Know-How)* Skills of diagnosing hypertensive disorders

- Taking and interpretation of blood pressure findings

- History taking, interpretation of signs and symptoms of the hypertensive disorder and imminent eclampsia

- Urine testing and interpretation of findings and blood results

- Interpretation of blood results

Section D: *(Show-How)* Nursing action taken by midwives interacting with doctors and

multidisciplinary team in finalizing the diagnosis. Applying their knowledge steered by the *Guidelines for Maternity Care in South Africa.*

Section E: Does (Applying knowledge in practice) Midwives acting according to the standing orders guided by maternity *Guidelines for Maternity Care in South Africa* and *Scope of Midwives* guided by SANC.

Section F: Observational checklist by the researcher

The questionnaire was answered in written form by respondents. Questionnaires were chosen because the sample size was large before but was reduced because of the restrictions of the pandemic disease, Covid-19. The questionnaire was less expensive, it has allowed respondents to be more honest by providing anonymity.

3.10 Pre-Test

The pre-test was done after designing the instrument and having selected the sample population, pre-testing the instrument on a neutral population, but with the same characteristics as the study population. The pre-test was done to help the researcher to assess the reliability and validity of the instrument where correction was done before the main research. The researcher also pre-tested herself in using the questionnaires. The instrument was pre-tested at Musina Hospital on 8 midwives which formed 10% of the population. The midwives in Musina Hospital didn't form part of the research population in the main study. The hospital was selected only for pre-test. The findings were that some questions were not answered appropriately because participants did not understand the framing of the questions. Corrections were made from the questions that were not clearly understood by participants and rephrasing of questions was done (Akinsola, 2005)

3.11 Validity and Reliability

Validity is the ability of an instrument to measure the variable that it is intended to measure. Reliability is the consistency and dependability of the instrument in measuring a variable (Brink *et al.*, 2017). Content validity was checked where the

assessment was made, to check if the instrument represents all components of the variable and this revealed what was needed to be included in the content. Criterion-related validity is an approach used in establishing relationship scores on the instrument in question and other external criteria, if the data collected using the instrument in question closely matched the data collected using criterion measure, then the conclusion was made that the instrument was also valid. Face validity was assured by determining the readability and clarity of the content which was based on an intuitive judgment by the supervisors (Brink *et al.*, 2017). The data collected using the instrument developed closely matched the data collected using criterion measure, hence, the conclusion was made that the new instrument was also valid.

Reliability has been tested by pre-testing the instrument on a neutral population, but with the same characteristics as the study population. The midwives from Musina Hospital were not part of the population. Test-retest reliability has been done, which was the repeating of the question to the same group on two different occasions two weeks apart to compare the results. It was considered reliable after the test (Brink *et al.*, 2017)

3.12   Plan for Data Collection

The researcher prepared first by familiarising herself with the data collection tool. The questionnaires were checked first by the supervisors. English was used as the medium of instruction. After obtaining the ethical clearance certificate (Appendix A) and permission from the Department of Health (Appendixes B & C), CEOs of the hospital, and District Executive Managers for health centres (Appendixes D & E), the researcher communicated and made appointments with the managers of maternity wards in selected facilities. No venue was arranged for answering the questionnaires as social gatherings were prohibited. The appointment was made telephonically with

managers of the selected facilities. Questionnaires were sent to midwives by the researcher. After an explanation by the researcher what was expected of them, an information letter was given to them (Appendix F) and all participants signed a consent form (Appendix G). Questionnaires (Appendix H) were handed over by researcher and collected after completion by the respondents. They completed it during their lunchtime and when they were off duty. The information letter and consent form had been given before collection of data. The response rate was 100%. Ethical aspects were assured by the researcher.

3.13   Plan for Data Management and Analysis

The researcher kept the data collected under lock and key, where the information was accessed by the researcher and the supervisors. The researcher could not link the information given by the respondents as names had not be used when answering the questionnaires. Descriptive codes have been used for data analysis, enabling the researcher to summarise, organise, evaluate, interpret, and communicate the numerical information. The statistical technique reduced data into manageable parts by summarising and describing various characteristics of the data which were then analysed using descriptive approaches such as frequency distribution and measures of relationships on how variable correlate. The Statistical Package for the Social Sciences (SPSS) version 25 was used to analyse data. All data were coded and entered into the statistical software programme. A statistician was involved in analysing the data. The results were interpreted in terms of the framework and the headings of the questionnaire.

3.14   Ethical Considerations

In this study, the ethical principles of conduct were considered. The ethical clearance certificate, project no: SHS/19/PDC/29/2708 (Appendix A) was granted after the

proposal was evaluated by the School of Health Sciences and Higher Degree Committee of UNIVEN. Letters requesting permission to conduct the study were submitted to the Limpopo Department of Health (Appendixes B & C), and application letters were sent to the CEOs and District Executive Managers of the selected hospitals (Appendixes D & E). An appointment with facilities managers was made to explain the purpose of the requests and to be granted permission to conduct the study. The participants have the right to give voluntary informed consent, where they were informed about what is expected and the nature of the study. Other ethical considerations were included:

3.14.1   The Principle of Beneficence

The researcher abided by the principle of beneficence, by protecting the subject from any form of harm, psychological and emotional. The researcher-maintained freedom from exploitation because the researcher indicated that the information provided was not used against them.

3.14.2   The Principle of Human Dignity

The researcher maintained respect for human dignity by granting the participants the right to voluntarily participate in the study, given the option to withdraw participation if they were not comfortable and requesting further clarification on any point on which they were not clear. The researcher took responsibility to fully disclose every important aspect about the study.

3.14.3   The Principle of Justice

The researcher made sure that all participants were treated fairly and equally by honouring all the agreements. Privacy was maintained throughout the study where anonymity was adhered to. Participants could not be linked with their information as

names were not needed.

3.14.4 Informed Consent

All participants were fully explained what was expected from them and that they have the right to give voluntary written informed consent.

3.14.5 Plan for Dissemination of Results

The sharing of the results is an essential part of the research process (Kane & Brun, 2005). The research report will be presented in written form, verbal reports, and workshops. These will be done during perinatal meetings with the facilities concerned. The researcher will make sure that the results are incorporated with the works of others in support of the report.

3.15 Conclusion

A descriptive, explanatory, quantitative method was used to assess midwives' knowledge and skills in diagnosing hypertensive disorders during pregnancy in selected facilities in Vhembe District, South Africa. The study population was 77 midwives. Systematic sampling was used to select midwives who were working in maternity wards. The researcher purposively selected the facilities with a high number of deliveries. Questionnaires were used to collect data from midwives in selected facilities. The researcher reached the respondents through the managers of maternity units where data were collected by handing questionnaires to the midwives. Ethical issues were considered throughout data collection. Analysis and interpretation were presented in the form of graphs and tables with the help of a statistician. Recommendations were made based on the findings of the study. The next chapter will cover the presentation and discussion of the results.

CHAPTER 4

PRESENTATION AND DISCUSSION OF THE RESULTS

4.1 Introduction

In the previous chapter, the researcher discussed the research methodology, which includes the following: study design, study setting, population and sampling, measurement instrument, validity, and reliability, plan for data collection, management, and analysis, ethical considerations and plan for dissemination of results. This chapter concerns data presentation and discussion of the data obtained from 77 midwives who worked in either a hospital or health care facility.

The purpose of the study was to assess the knowledge and the skills of midwives in diagnosing hypertensive disorders in pregnancy in a selected hospital in Vhembe District, Limpopo Province, South Africa. The analysis starts with demographic descriptive statistics of the participants and is followed by descriptive statistics of the participants' knowledge and skills. The results are presented in the form of frequencies and percentages. The chapter explains the following demographic characteristics: age of the participants, gender, race, participants' experiences while allocated in the maternity ward, experience as a midwife, the facility where participants were deployed, and midwifery status. It further expounds the following: participants' knowledge about hypertensive disorders, skills of diagnosing hypertensive disorders, nursing action taken by midwives, applying knowledge in practice and analysis of the scope of midwives using an observational checklist implemented by the researcher on how BP is measured and urinalysis performed.

4.2   Demographic Characteristics

This part of the study entails the age in years, gender, race, work experience in the maternity ward, experience as a nurse, facilities, and the type of midwives.

4.2.1   Age Distribution of the Respondents

The 77 respondents indicated their age as shown in Figure 4.1.
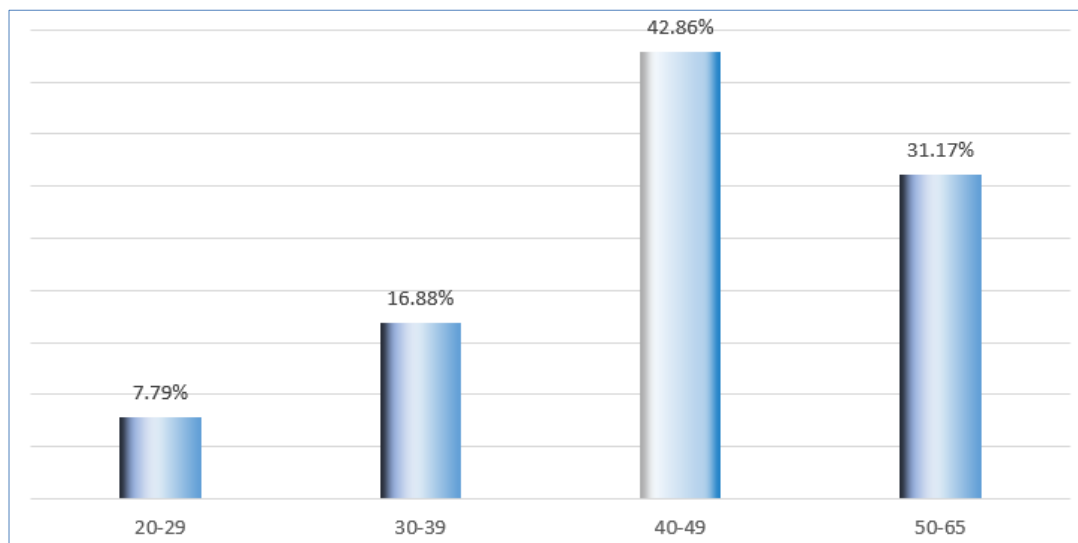
Figure 4.1: Age distribution of the respondents

The majority of the respondents (42.86%) were in the age group 40–49 years, followed by those in the age group (combined) 50–59 years and 60–65 years accounting for 31.17% of the respondents, followed by 16.88% of the individuals in the 30–39 age group and 7.79% were in the 20–29 age group. The results indicate that the nursing profession, particularly midwifery, is dominated by individuals aged between 40–49 years, whereas young professionals who were in their 20s constituted the lesser age group. The age groups between 50–59 and 60–65 made up 31.17% of the total sample. This result is considered good for the profession, as individuals in these age groups can mentor the newly qualified midwives in diagnosis and management of

hypertensive disorders in pregnancy. The age distribution of midwives by the SANC (2018) indicated that the age of midwives between 40–49 years was 27% and between 50–59 was 29%, which represented the highest number of midwives. Most individuals in the young age group are those who are newly qualified with less skills and experience, but most of those at advanced stage have experience, but their knowledge and skills need to be upgraded and enhanced through in-service training and workshops, as knowledge changes with the time. Newly qualified midwives can diagnose hypertensive disorders using their newly updated knowledge from nursing school. Bäck, Hildingsson, Sjöqvist & Karlström (2017) in their study of developing competence and confidence in midwifery-focus groups with Swedish midwives, indicated that professional confidence of midwives develops over time, achieving competence is a time-consuming process, and showed that midwives believed that competence grows with experience. In this study, it is recognised that the confidence of making a proper diagnosis comes with experience and confidence. The midwives between 40–49 and 50–59 and 60–65 combined, because of their experience and confidence, usually make a proper diagnosis (Bäck *et al.*, 2016).

4.2.2 Gender Distribution of the Respondents

Respondents were also requested to indicate their gender as part of the study. The responses are depicted in Figure 4.2. The respondents comprised of 96% females and 4% males. This difference between females and males was attributed to the nature of the job according to perceptions imposed by various cultures. Most of the cultures in Africa have subscribed nurses as a female-oriented job. Likis & King (2020), in their study of gender diversity and inclusion in midwifery, showed that midwifery is a profession that is composed almost entirely of women. They indicated that the diversification of the profession concerning race and ethnicity has received increasing attention, but gender diversity within midwifery has not been well explored.
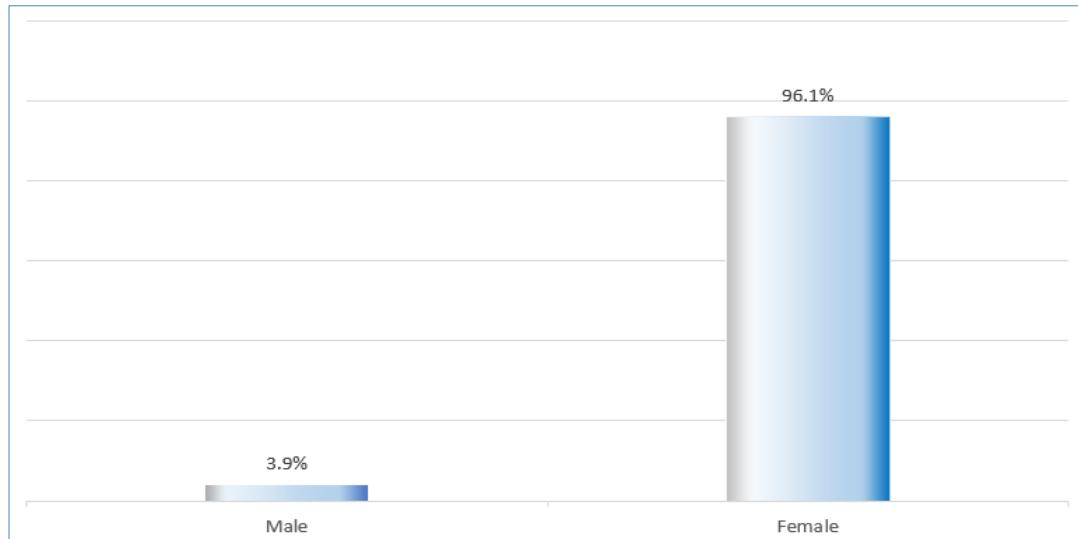
Figure 4.2: Gender distribution of the respondents

The examples include the beliefs that women prefer female perinatal care providers or men cannot provide empathy because they cannot become pregnant and give birth (Likis & King, 2020). Bly, Ellis, Ritter & Kantrowitz-Gordon (2020) indicated that nearly 99% of midwives in the United States are women which indicates that it is not only predominant in the USA, but even outside, e.g., in African countries which face the same challenge. In this study, women are also dominating our facilities. Gender does not have any effect on diagnosis of hypertensive disorders in pregnancy unless when considering the beliefs that men cannot provide empathy as they cannot become pregnant, which can make them miss out during assessment if empathy is excluded (Bly *et al.*, 2020).

4.2.3   Race Distribution of the Respondents

As part of the demographic characteristics, race was also considered, and findings are displayed in Figure 4.3. The majority (98.7%) of the respondents were African, whereas 1.3% were white. This fact shows the dominant race correlates with the study's geographical areas. In the Vhembe District, facilities are dominated by

Africans, and most people who use the government facilities are Africans.
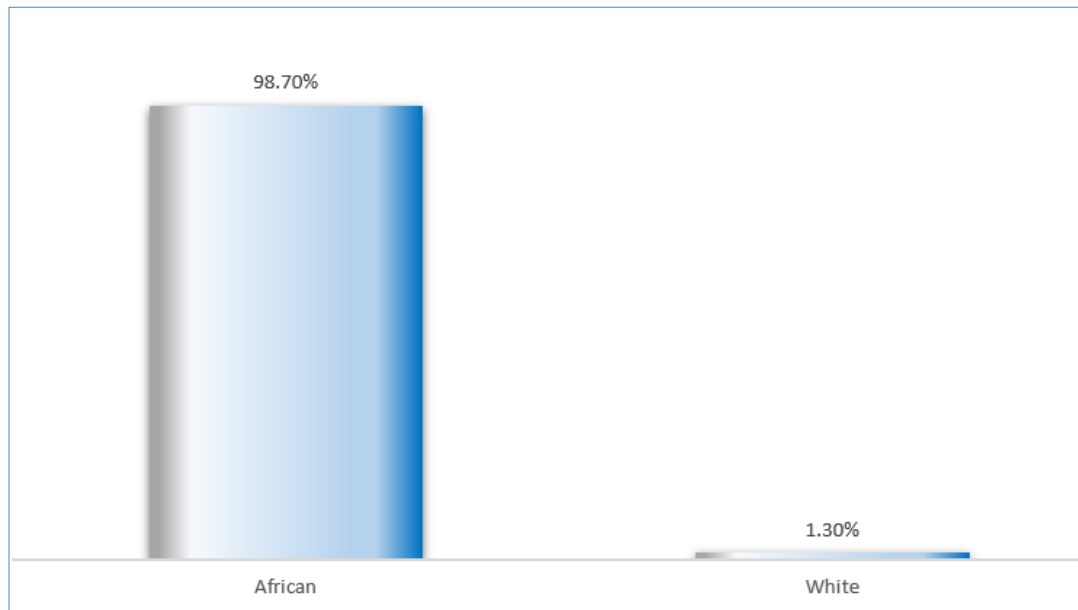
Figure 4.3: Race distribution of the respondents

Findings indicate that race might contribute negatively to the diagnosis of hypertensive disorders if there is a language barrier between midwives and pregnant women. Most important information can be left out during assessment and history taking, which forms the part of diagnosis. Serbin & Donnelly (2016), for instance, indicated that interpersonal and institutional racism are significant problems in clinical, educational, and professional settings and act as barriers to further diversifying the profession. They further indicated that midwives should work to create a midwifery profession whose racial demographics mirror that of the population being served. In this study, there were no problems of the race barrier due to the implicit geographical dominance.

Henderson, Gao & Redshaw (2013) showed the importance of training of health care professionals in cultural sensitivity and the use of interpreters, advocates, and link workers has been emphasised in government reports, and the Equality and Human

Rights Commission published a code of practice for maternity units aimed at eliminating racial discrimination and increasing equality of opportunity. In the Vhembe District, the community is mixed with individuals from neighbouring countries like Zimbabwe, Mozambique people and other African countries, where interpretation is needed to reduce the language barrier (Henderson *et al.*, 2013).

4.2.4   Years of Experience of the Respondents in Maternity Ward

The years of experience in the maternity ward were also investigated and findings are shown in Figure 4.4.
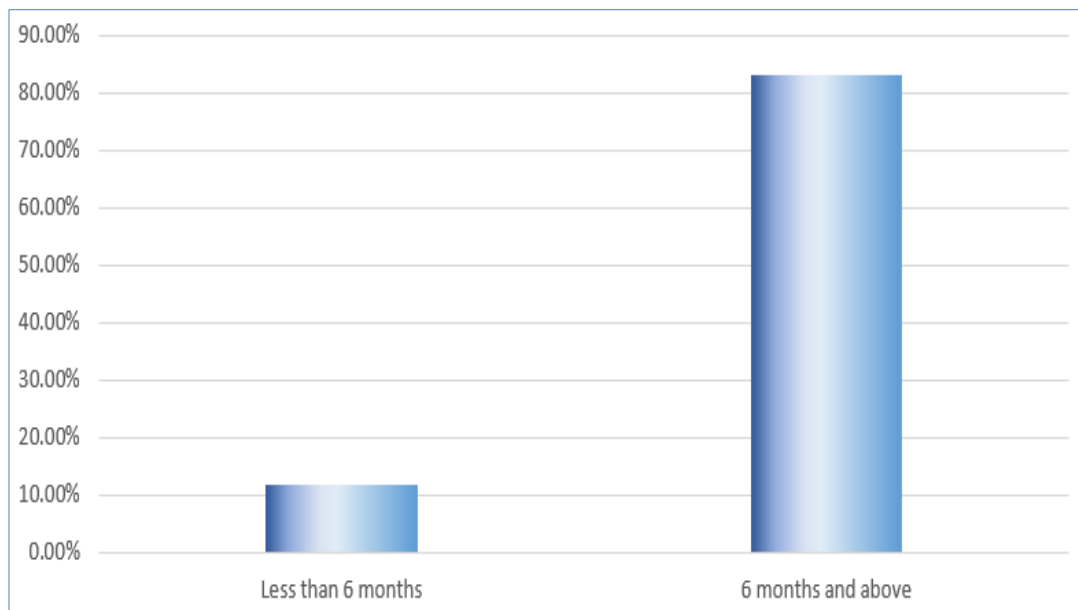
Figure 4.4: Years of experience of respondents in maternity ward

The majority of the respondents (83.12%) indicated that they had 6 months or more and 11.69% specified "less than 6 months" experience. The majority of the respondents thus had more than 6 months of work experience which is an adequate period to learn new skills and adopt beneficial practice habits. As discussed in Section 4.2.1 (Age Distribution of the Respondents), the nursing profession, particularly

midwifery is dominated by individuals aged between 40–65 years represent the experts in the profession and can therefore mentor young professionals in the 20–39 age group. In this study, years of experience is acknowledged to play an important role when dealing with pregnant women as Back *et al.* (2016) underscored the importance of being a competent midwife with confidence to practice, including the ability to make critical decisions in an urgent situation where professional autonomy is very crucial. Most experienced midwives can make a diagnosis quickly and take a decision immediately according to the severity of the condition. Midwives with less experience will first need a second opinion because they have not yet nursed some of the conditions. In this study, it was enlightening, but not entirely surprising, that most experienced midwives can provide mentorship to the less experienced ones.

Competence and confidence start during training as a student, where there is a lack of supervision and poor role-modelling in the clinical setting. Contributory factors can be the negative attitude of the staff toward students, lack of equipment and sometimes leaving the students alone. Good clinical supervision for student midwives is very important as it creates competent practitioners (Thwala, 1999).

4.2.5   Facilities Where Respondents Provided Health Care

Respondents (n=77) were requested to indicate the facility where they provided health care and the results are displayed in Figure 4.5. This question had two choices, that is, the hospital and health care centres. Most diagnoses of hypertensive disorders are done at the primary level of care because that is where the booking for antenatal care is done, and low-risk women received their care and managed there. The majority of the respondents (67.5%) delivered health care at the hospital and the remainder (32.5%) at health care centres. The *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) indicated that approximately 60–70% of all women who

use government facilities will require the service of a hospital at some stage during pregnancies, and about 15% of women will require service of a specialist obstetrician at a regional or tertiary hospital.
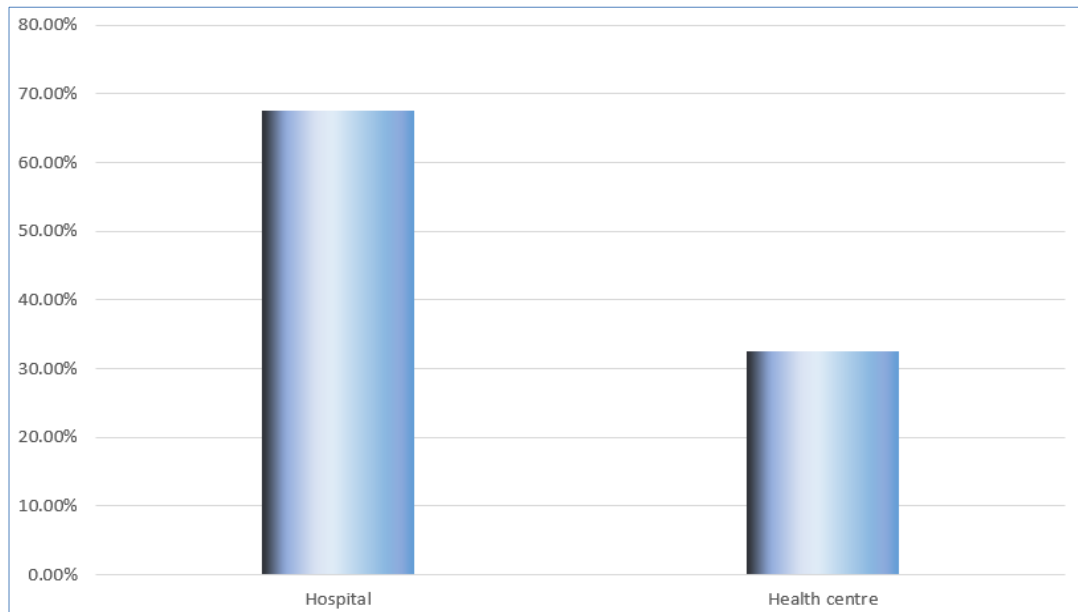
Figure 4.5: Facilities where respondents provided health care

According to De Jonge, De Vries,Lagno-Janssen, Malala, Declercq, Downe & Hutton (2015), primary midwifery care is the first level of contact with the maternity care system and it fulfils most preventive and curative maternal and new-born health needs as closely as possible to where people live and work. That is the reason every woman who ends up in a hospital facility should have started with the primary care midwives. Midwives from primary care need to refresh their skills by in-service training and workshops in order not to miss the diagnosis at the early stage of pregnancy. In this study, most of the staff was allocated at the hospital level because most of the patients seen at the primary care level ended up at the hospital, to treat early and to prevent complications that can follow because of late diagnosis of hypertensive disorders. In terms of facility, more than half, which is 67.5%, stated that hospital, following

respondents, i.e., 2.47%, who indicated health care centre. It is noticeable that most respondents worked at the hospital compared to health care centres. In general, hospitals have more nurses than health care centres. This is because the health care centres refer their cases to the hospitals for further management by obstetricians.

4.2.6   Midwifery Status: Midwife or Advanced Midwife

Figure 4.6 indicates the distribution of respondents according to their midwifery status. The classification was in two categories, which is midwifery and advanced midwifery.
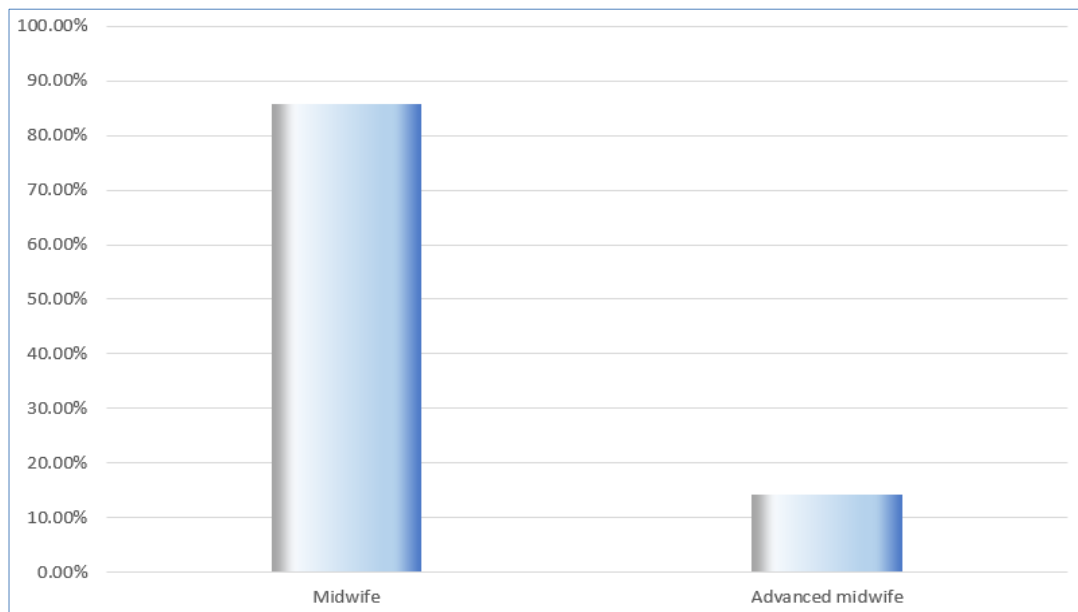
Figure 4.6: Midwifery status of the respondents

The majority (85.7%) of the respondents had midwifery experience while 14.29% of individuals had advanced midwifery experience. Advanced midwives have a skill that is front-line in treating the pregnant woman when it is compared with the general midwives. This notion is supported by the results. There is a difference between midwives and advanced midwives because of their level of education as far as midwifery is a concerned.

Duma, Dippenaar, Bhengu & Oosthuizen (2014) defined a midwife with a specialty as a professional who has been prepared beyond the level of a generalist and authorised to work in the field of midwifery. The person has acquired expert clinical knowledge and skills that include complex decision-making abilities. Advanced midwives are critically needed to assist in early diagnosis and timely decision taking on women with hypertensive disorders. In primary health care, diagnosis is primarily made by midwives, but the most advanced midwives are still needed to assist the midwives and reduce missing out of pregnant women at an early stage of pregnancy (Duma *et al.*, 2014).

4.3   Knowledge of Hypertensive Disorders

Table 4.1 summarizes the knowledge of respondents about hypertensive disorders. The results are presented in terms of frequencies and percentages. Furthermore, the knowledge was tested using a text response where respondents were expected to choose the best possible answer or option. The majority of the respondents (66.2%) were of the view that "Most common cause of maternal mortality, Responsible for significant perinatal and maternal morbidity, include chronic hypertension" define hypertensive disorder, however, only 23.4% stated that it is the most common cause of maternal mortality. Of the respondents, 5.2% indicated that it is responsible for significant perinatal and maternal morbidity, and 1% believed it includes chronic hypertension. The findings illustrate that the respondents had a sound knowledge of what hypertensive disorders are. As shown in Table 4.1, the majority of respondents (85.7%) selected "Persistent high blood pressure" as the definition of hypertension, 3.9% selected "Systolic BP of 120 mmHg" and 6.5% indicated "Persistent high blood pressure, Systolic BP of 120 mmHg". The responses imply that respondents have sufficient knowledge about the characteristics of hypertension.

Table 4.1: Respondents' knowledge about hypertensive disorders

Variables		Number	Percent
Hypertensive disorders are	The most common cause of maternal mortality	18	23.4
	Responsible for significant perinatal and maternal morbidity	4	5.2
	Include chronic hypertension	1	1.3
	All of the above	51	66.2
Hypertension is	Persistent high blood pressure	66	85.7
	Systolic BP of 120 mmHg	3	3.9
	All of the above	5	6.5
Hypertensive disorder in pregnancy include	Pre-eclampsia	19	24.7
	All of the above	53	68.8
Hypertensive disorders include	Chronic hypertension.	7	9.1
	Gestational hypertension	3	3.9
	Pre-eclampsia	3	3.9
	All of the above	62	80.5
Causes of pre-eclampsia	Unknown	42	54.5
	Eating lot of salt	1	1.3
	None of the above	33	42.9
Women at risk to develop pre-eclampsia	35 years and above	37	48.1
	Illiterate women	1	1.3
	None of the above	38	49.4
Signs of imminent eclampsia include	Dizziness	2	2.6
	All of the above	75	97.4
An effective method of treatment and cure of pre-eclampsia	Attend antenatal clinic	28	36.4
	Delivery of the baby	38	49.4
	Low salt diet	9	11.7
Drug of choice when there is eclampsia	Magnesium Sulphate	77	100
The complication of the hypertensive disorder can be prevented by	Early detection and timely intervention	75	97.4
	None of the above	2	2.6

On the subject "Hypertensive disorder in pregnancy include", 68.8% selected "Chronic hypertension, HELLP syndrome and pre-eclampsia", 24.7% picked "Pre-eclampsia" and 6% did not respond to the question. On this hypertensive characteristic, respondents had appropriate knowledge. Hypertension disorder includes chronic hypertension according to 9.1% of the respondents, Gestational hypertension according to 3.9%, Pre-eclampsia according to 3.9% of the respondents, but 80.5% specified "All of the above". The majority of the respondents were aware of what is entailed in hypertensive disorder.

Approximately 1% of the respondents identified causes of pre-eclampsia as "Eating a lot of salt", 42.9% chose none of the definitions provided, 54.5% indicated that it is "Unknown". The results indicate that respondents were not fully knowledgeable of the causes of pre-eclampsia. The majority of the respondents (49.4%) were of the view that women at risk to develop pre-eclampsia, are in the age group "35 and above", 1% indicated "Illiterate women" and 49.4% indicated "None of the above". The findings imply that respondents had sufficient knowledge on which women were more at risk of developing pre-eclampsia.

Signs of imminent eclampsia were identified as "Dizziness" by nearly 2.6% of the respondents, while the majority (97.4%) indicated "Dizziness, Severe headache, Visual disturbance". The majority of the respondents (97.4%) thus demonstrated sound knowledge on the signs of imminent eclampsia. Almost half of the respondents (49.4%) mentioned "Delivery of the baby", 11.7% indicated "Low salt diet" and 36.4% indicated "Attend antenatal clinic" as the effective method of treatment and cure of pre-eclampsia. All the respondents, 100%, identified "Magnesium Sulphate" as the drug of choice when there is eclampsia. It was indicated by 97.4% of the respondents that "Early detection and timely intervention" and only 3% that "None of the mentioned (exercising, bed rest and early detection and timely intervention)" as the responses to

the subject "Complication of the hypertensive disorder can be prevented by".

The findings of the knowledge of hypertensive disorders by midwives still show some gaps in certain areas that are needed when diagnosing hypertensive disorders, like in responding to the definition, causes of pre-eclampsia, and women at risk. Stellenburg & Ngwekazi (2016) in their study of the knowledge of midwives about hypertensive disorders during pregnancy in primary health care indicated that the knowledge of midwives is deficient regarding hypertensive disorders in pregnancy. Suff, Jatoth, Khalil & O'Brien (2011) have shown a significant gap in both knowledge and practice in their study on knowledge of hypertensive disorders in pregnancy among obstetricians and midwives and they concluded that diagnosis and management of hypertension in pregnancy should be standardised across the UK health care system.

4.4   Skills of Diagnosing Hypertensive Disorders

The respondents' skills of diagnosing hypertensive disorder were investigated and the findings are shown in Table 4.2. The majority of the respondents (76.6%) indicated "5 minutes" as a response to the question "How long should the patient rest before BP measurement?", while 13% indicated "Unnecessary to rest", followed by 3.9% who mentioned "3-4 minutes", followed by 2.6% who indicated "1–2 minutes". To the question "What should be the position of the arm be during BP measurement?", 19.5% of the respondents, stated "Under heart level", 3.9% indicated "Above heart level" and the majority, 63.6%, indicated "At heart level" and 6.5% mentioned "Not necessary". Respondents were asked "Which BP readings show severe pre-Eclampsia?" to which the majority (81.8%) stated "Diastolic BP of ≥ 110, and diastolic of greater of 160 mmHg", 10.4% indicated "Systolic diastolic of 140 and diastolic of 90 mmHg" and 5.2% selected "All of the above". The majority (75.3%) selected "The development of hypertension", 6.5% indicated "That there is eclampsia", and 7.8% indicated "None of

the above" to the question "Increase of BP levels of 30 mmHg systolic and 15 mmHg over the values at first booking indicate:"

Table 4.2: Respondents' skills of diagnosing hypertensive disorders

Variable		Number	Percent
How long should the patient rest before BP measurement?	5 minutes	59	76.6
	3–4 minutes	3	3.9
	1–2 minutes	2	2.6
	Unnecessary to rest	10	13
What should be the position of the arm be during BP measurement?	Under heart level	15	19.5
	Above heart level	3	3.9
	At heart level	49	63.6
	Not necessary	5	6.5
Which BP readings show severe pre-Eclampsia?	Diastolic BP of ≥110, and diastolic of greater of 160 mmHg	63	81.8
	Systolic diastolic of 140 and diastolic of 90 mmHg	8	10.4
	All of the above	4	5.2
Increase of BP levels of 30 mmHg systolic and 15 mmHg over the values at first booking indicate:	The development of hypertension	58	75.3
	That there is eclampsia	5	6.5
	None of the above	6	7.8
History taking can include asking:	Previous pregnancies	3	3.9
	Medical conditions	3	3.9
	All of the above	70	90.9
What are the signs of imminent Eclampsia, that patient can verbalise?	Severe headache	1	1.3
	Epigastric pain	2	2.6
	All of the above	74	96.1
Proper history taking can contribute in	Making proper diagnosis	10	13
	Nursing patient in totality	2	2.6
	All of the above	63	81.8

Continued/…

Table 4.2: Respondents' skills of diagnosing the hypertensive disorder (*continued*)

Which results in urine dipstick suggests the development of hypertension?	Protein in urine	73	94.8
	None of the above	3	3.9
HELLP syndrome is:	Presence of haemolysis	7	9.1
	Elevated liver enzymes	9	11.7
	All of the above	48	62.3
What are the baseline blood investigation to be done?	FBC, LFT, Uric acid,	58	75.3
	FBC, Urea and Electrolytes (U&E)	14	18.2
	FBC, HIV	1	1.3
	FBC, random glucose	2	2.6
Which result needs attention?	Elevated liver enzymes, Low platelets. Raised uric acid	40	51.9
	Decreased liver enzymes, Elevated platelets	4	5.2
	None of the above	6	7.8
	All of the above	23	29.9

On the subject, "History taking can include asking", 3.9% specified "Previous pregnancies", another 3.9% indicated "Medical conditions", and the majority, 90.9%, selected "Both previous pregnancies and medical conditions". Of the respondents, 96.1% contemplated that "Severe headache and epigastric pain", while 1.3% indicated "Severe headache only" and 2.6% mentioned "Epigastric pain" as a response to the subject "What are the signs of imminent Eclampsia, that a patient can verbalise?"

It was indicated that "Proper history taking can contribute in", "Making proper diagnosis" by 13% of the respondents, "Nursing patient in totality" by 2.6% and 81.8% mentioned both. On the matter, "Which results in urine dipstick suggests the development of hypertension?", the majority, 94.8% indicated "Protein in urine", 3.9% cited "None of the above (protein in urine, glucose in urine, ketones) and 1% did not

answer. On the question, "HELLP syndrome is:", 9.1% of the respondents chose "Presence of haemolysis" whereas 11.7% indicated "Elevated liver enzymes", whereas the majority (62.3%) selected "all of the above". Respondents were also tested on the matter "What is the baseline blood investigation to be done", and the majority, 75.3% specified "FBC, LFT, and Uric acid", followed by 18.2% who stated "FBC and U&E", 1.3% indicated "FBC and HIV", and 2.6% indicated "FBC and random glucose". The majority of the respondents (51.9%) indicated "Elevated liver enzymes, Low platelets. Raised uric acid", 5.2% stated "Decreased liver enzymes, elevated platelets", 7.8% mentioned "None of the above" and 29.9% mentioned "All of the above" to the question "Which result needs attention?".

In determining the skills of midwives, the respondents showed more understanding with a little gap in knowing how to position the arm and to interpret the blood results, which are also very important in diagnosing hypertensive disorders. The *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) emphasised blood results that indicate the presence of pre-eclampsia and HELLP syndrome. The *Queensland Clinical Guideline* (2016) also indicated the blood investigation needed to diagnose pre-eclampsia and shows the normal and the abnormal ranges. The National Health Laboratories also show the normal and abnormal ranges with the results so that the midwives should be able to interpret the results that need urgent attention. Results also assist and making the diagnosis, where organ damage shows up the midwives should be able to interpret this by looking at the blood results.

4.5   Nursing Action Taken by Midwives

As indicated in Table 4.3, respondents were tested on the actions they take as midwives. On the subject "What is the duty of the midwife in the health centre in nursing pre-eclampsia?", the majority 93.5% stated that they would give treatment

according to the standing order and transfer the patient, followed by 3.9% who would give treatment according to standing order and admit at the health centre, while 2.6% would not do either.

Table 4.3: Respondents' answers to "Nursing action taken by midwives"

Variables		Number	Percent
What is the duty of the midwife in health centre in nursing pre-eclampsia?	Give treatment according to the standing order and transfer the patient	72	93.5
	Give treatment according to standing order and admit at the health centre	3	3.9
	None of the above	2	2.6
Which treatment is to be given at the clinic according to the guideline?	Aldomet up to 1g Magnesium Sulphate regime Adalat	68	88.3
	Aldomet, Labetolol Magnesium Sulphate regime	7	9.1
Responsibility of the midwife at the hospital when nursing patient with imminent Eclampsia	Stabilize the patient by giving treatment according to the guideline and report to the doctor	69	89.6
	Call the doctor without giving any treatment	5	6.5
Responsibility of district hospital in nursing severe pre-Eclampsia	Stabilize the patient and keep in the ward	12	15.6
	Stabilize the patient and transfer to a specialist centre	42	54.5
	To consider deliver the women through C-Section.	18	23.4

The majority of the respondents (88.3%) stated "Aldomet up to 1g Magnesium Sulphate regime Adalat", 9.1% mentioned "Aldomet, Labetalol Magnesium Sulphate regime", and 3% did not respond to the question, "Which treatment is to be given at the clinic according to the guideline?". Of the respondents, 89.6% selected the option "Stabilize the patient by giving treatment according to the guideline and report to the doctor", 6.5% selected "Call the doctor without giving any treatment", and 3.5% responses were not completed on the question of "Responsibility of the midwife at the hospital when nursing a patient with imminent Eclampsia". On the subject "Responsibility of district hospital in nursing severe pre-Eclampsia", 15.6% of the

respondents indicated "Stabilize the patient and keep in the ward", the majority (54.5%) selected "Stabilize the patient and transfer to a specialist centre", while 23.4% indicated "To consider deliver the women through C-Section".

In considering the actions taken by midwives at primary health care and district hospitals, midwives demonstrated some gaps because at the primary health care centres, they are not supposed to nurse pre-eclampsia, but there are still midwives who feel they can nurse a pre-eclamptic patient at the primary level. At the primary level of care, the eclamptic patient becomes an emergency transfer to the hospital for better care. The respondents also showed a gap in nursing severe pre-eclampsia at the district hospital. According to the *Guidelines for Maternity Care in South Africa* (Department of Health, 2016), treating severe pre-eclampsia in a District hospital, an effort should be made to transfer in the institution where there is specialist care, as mother and baby need high care and ICU during the disease. Midwives, in taking action, are implementing one of the four-stage Hierarchy of Competencies, which is George Miller's Pyramid of clinical competencies, which was used as a theoretical framework in this study. Midwives are categorised under stage four, that is, where they apply the knowledge in practice. (Downing & Yudkowsky, 2009).

4.6   Applying Knowledge in Practice and Scope of Practice of Midwives Guided by SANC

The knowledge in practice guided by the SANC was assessed and displayed in Table 4.4. The majority of the respondents (97.4%) selected Magnesium Sulphate while 2.6% picked Labetalol to the question "What is the drug of choice of managing eclamptic patient?". On the matter "Can a midwife give standing orders treatment before the doctor prescribe?", the majority of the respondents (90.9%) indicated "Yes" while 9.1% stated "No". The majority (84.4%) specified "Yes" while 15.6% indicated "No" to the question "Does the scope of midwives allow diagnosis by midwives?".

Table 4.4: Application of knowledge in practice of midwives guided by SANC

Variable		Number	Percent
What is the drug of choice for managing eclamptic patient?	Magnesium Sulphate regimen	75	97.4
	Labetalol	2	2.6
Can a midwife give standing orders treatment before the doctor prescribe?	Yes	70	90.9
	No	7	9.1
Does the scope of midwives allow diagnosis by midwives?	Yes	65	84.4
	No	12	15.6

Midwives should know their scope of practice, by being familiar with what is expected of them and what they are not supposed to do as guided by the South African Nursing Council (SANC). Midwives responded well in knowing the drug of choice in the treatment of the eclamptic patient. Only 3% did not know the drug of choice while managing eclampsia. The scope of practice for midwives entails the diagnosis of the health needs and the facilitation of the attainment of optimum physical and mental health for the mother and child. In this study, 16% of the respondents indicated that midwives are not allowed to diagnose. Both midwives and advanced midwives are allowed to make a diagnosis in a pregnant woman for better care and the right treatment. According to the SANC, in terms of Section 45(1)(q) of the Nursing Act, 1978 (Act 50 of 1978), midwives should indicate their knowledge about the standing orders, yet 9% did not know about the standing orders. Chada (2019) indicated that the standing orders in obstetrics are ordered in which a nurse may act or carry out specific orders for the patient who presents with symptoms or needs addressed in the standing orders. They must be in a written form and signed and dated by a Licensed Independent Practitioner. In this study, midwives should know that Magnesium Sulphate is the drug of choice for controlling eclamptic fits. The objectives of standing orders are to maintain the continuity of the treatment of the patient and to protect the

life of the patient and create a feeling of responsibility in the members of the health team (Chada, 2019).

4.7   Analysis from the Observational Checklist

Table 4.5 summarizes the analysis from the observational checklist.

Table 4.5:   Analysis from the observational checklist

Patient in a comfortable position				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0
All 5 respondents (100%) selected "Yes" to the item "*Patient in a comfortable position*".					

Patient informed that BP is going to be measured				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0
Similarly, all the of the 5 respondents which are 100%, selected "Yes" to the observation checklist which read "Patient informed that BP is going to be measured"					

Ask about factors affecting BP (anxiety, exercise, coffee)				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0
Likewise, 100% of the respondents chose "Yes" to the item "Ask about factors affecting BP (anxiety, exercise, coffee).					

Rest at least 5 minutes prior to reading BP				
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	80.0	80.0	80.0
	No	1	20.0	20.0	100.0
	Total	**5**	**100.0**	**100.0**	
On the observation checklist which reads "Rest at least 5 minutes prior to reading BP" all of the respondents indicated "Yes".					

Using appropriate cuff size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0

In the same manner, findings indicated that the observation checklist "Using appropriate cuff size" had 100% of the respondents indicating "Yes".

Arm at heart level during BP measurement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0

"Arm at heart level during BP measurement" was part of the observation checklist, result shows that 100% of the respondents chose "Yes".

Action taken with abnormal BP

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0

Identically, 100% which is 5 respondents indicated "Yes" on the subject "Action taken with abnormal BP"

Urine dipstick is done using clean utensils

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0

The findings also indicated that 100% of the respondents agreed that "Urine dipstick is done using clean utensils".

After dipping is done using clean utensils

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	100.0	100.0	100.0

Results show that 100% of the respondents agreed that "After dipping is done using clean utensils".

4.8   Discussion of the Findings

4.8.1   Demographic Characteristics

The results of the study showed that there is a higher number of middle age, followed

by advanced age, and a lesser number in the younger age of between 20–29 and 30–39-year-old respondents in the maternity section. This can be an indication that more training is needed for midwives so that when they advance in age, retire there and be in the continuation of care. According to the age statistics of the South African Nursing Council (SANC, 2017), of the total number of registered midwives, those younger than 30 years old made up 5%, 30–39 (20%), 40–49 (27%), 50–59 (29%), 60–69 (16%). In this study, a similar trend was observed in that the highest number of midwives were aged between 40–49 years which represent 42.8%, whereas midwives aged between 50 and 59 accounted for second highest age group (31.17%). It is to the advantage of the newly qualified midwives, to be mentored by those who are matured in age and in the profession. In conclusion, the age of midwives that are dominating in our country is between 40–60 years (SANC, 2017).

In this study, it was confirmed that the nursing profession is still dominated by females (96%), whereas males made up 4%. Edmonson & Anest (2019) indicated that gender imbalances in nursing, our largest profession, is slow-to-change and still a complex problem compounded by stereotypes and unconscious bias, power, and privilege in health care and society. Solving these imbalances could accelerate the profession in reaching its full potential.

That nursing is predominantly female, obscures the fact that nursing is based on skills, knowledge, science, and expertise. The misleading belief is that women are more nurturing than men. When any population group is underrepresented, for whatever reason, organizations do not get the best possible job candidates. Likis & King (2020) showed that diversification of the profession regarding race and ethnicity has received increasing attention, but gender diversity within midwifery has not been well explored. In this study, women are still dominating the nursing profession as corroborated recently (Edmonson & Anest, 2019).

In selected facilities in Vhembe, Africans are dominating public facilities rather than whites which brings solution to the language barrier many Blacks face in their day-to-day lives. In this study, patients from most communities are cared for by nurses who can understand their language and some additions of migrants from outside the country, who mostly use English. When there is no barrier in the language it is easy for midwives to take a patient's history and make a proper diagnosis from the assessment and subjective data. Language barriers in a setting can negatively affect nurses' ability to communicate effectively with their patients and this results in a negative impact on the provision of appropriate, timely, safe, and effective health care to meet patients' needs. That is why interpreters are also needed for the continuity of care (Ali & Watson,2018).

Experience counts a lot when working with pregnant women. This study showed that there are more experienced midwives working in the maternity ward and very few midwives with less experience which further explains that the more experienced, the more knowledge and skills are developed. The *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) emphasised that quality care is related to the knowledge and skills of health care providers. Experience is a necessary, but not sufficient condition for the expertise and not all experienced nurses are experts—it was noted that several years on the job in the same similar situations may create competence (McHugh & Lake, 2010).

In this study, experience in midwifery is of utmost importance, like advanced midwives always work in the maternity ward without changing, which correlates with their number of years in maternity end up creating competence which is needed for the diagnosis of hypertensive disorders. More midwives were found in hospital than at the health centres because health centres refer their complicated cases to the nearest hospitals. The *Guidelines for Maternity Care in South Africa* (Department of Health,

2016) indicates that for cost-effective health management, clinics and hospitals should share the load of patient care, where clinics manage common and low-risk problems and hospitals the more difficult clinical entities. De Jonge *et al.* (2015) said that good multidisciplinary collaboration is vital, not only within primary care, but also between primary and specialist care. Primary care midwives should work in collaboration as part of interdisciplinary teams providing integrated care across community and hospital settings.

In facilities where data were collected 85.7% were midwives and 14.29% had advance midwifery credentials, thus indicating that more training of advanced midwives is motivated for more skills and knowledge in midwifery. In Liberia*, Maternal and Child Health Advocacy International* approached the Ministry of Health and WHO to train experienced midwives in advance obstetrics, and it was established to reduce rates of maternal and neonatal mortality. These were done because of the shortage of doctors (Dolo, Clack, Gibson, Lewis & Southall, 2016).

In this study, the findings indicate that there is still a shortage of advanced midwives, who with their knowledge and competency can bring more expertise to the diagnosis of hypertensive disorders in pregnancy and reduce the complications that follow, if not diagnosed early or misdiagnosed. Duma *et al.* (2014) indicated there is no doubt that the additional training and education received by advanced midwives make a difference to health care delivery. It also helps the professional nurse to develop and grow which will keep them engaged and dedicated. There is always knowledge and skills in addition to those acquired for practice as a registered midwife, which comes with expanded advanced skills specific for midwifery and management of emergencies in obstetrics.

4.8.2   Knowledge About Hypertensive Disorders

An assessment of knowledge about hypertensive disorders, the *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) has explained clearly what hypertensive disorders are, and there is still a gap as only 66% of the respondents knew about what hypertensive disorders are. These gaps can pose a major health challenge even in diagnosing hypertensive disorders during pregnancy. Every institution has guidelines for maternity care in South Africa, but what is needed is revision. Midwives responded well in indicating what hypertension is which is basic knowledge in nursing. Hypertensive disorders complicate if not detected early, the majority of midwives, i.e., 97.4%, displayed their knowledge by answering well on what to do, to prevent the complication. In using the recommended drug of choice in eclamptic patients, midwives indicated knowledge by responding to all of them correctly and resulted in a 100% correct response rate.

Moodley, Pillay, Buchmann & Pattinson (2019) reported that deaths from hypertensive disorders are not declining, some indicating that it is still climbing, also associated with high numbers of stillbirths and neonatal deaths. Reports further indicate that the predominant challenge is insufficient and poorly skilled doctors and nurses, especially in district hospitals in more rural areas, as well as non-use of standardised clinical protocols in tertiary and national central hospitals.

The *Queensland Clinical Guidelines* (2015) reported that the *Centre for Maternal and Child Enquiries* shows in that analysis of maternal deaths identified substandard care in many cases where there were major failures of communication between health care professionals, which, in some cases, may have contributed to the death of women. Effective communication may be enhanced with a multidisciplinary team approach that includes communication with practitioners, appropriate referral of high-risk women,

and use of early warning tools to monitor for and communicate clinical deterioration; this knowledge can prevent the complication of hypertensive disorders. Midwives were assessed in the classification of hypertensive disorders where 68.8% were able to answer correctly and 31.2% did not know how to classify hypertensive disorders. These results raise the concern that if midwives fail to classify hypertensive disorders, they cannot diagnose them. The Department of Health (2016) provides definitions and classifications of hypertensive disorders in pregnancy. The classification of these disorders helps nurses to know the severity of the disease and how to act. The *Queensland Clinical Guidelines* (2016) indicate that all women presenting with new hypertension after 20 weeks should be assessed for signs of pre-eclampsia. The earlier the gestation at presentation and the more severe the hypertension, the higher the likelihood that the woman with gestational hypertension will progress to develop pre-eclampsia or an adverse pregnancy outcome.

Dadelszen, De Campos & Barivalala (n.d) discussed the classification of hypertensive disorders and indicated that the purpose of classifying diseases is to facilitate communication among caregivers and to create meaningful groups with different prognostic considerations for surveillance and outcome. In this study it is recognised that not all hypertensive disorders of pregnancy carry the same level of risk for women and their babies, therefore, the classification into pre-existing (chronic) hypertension, gestational hypertension, pre-eclampsia matters most.

Magee *et al.* (2014) showed the revised classification for hypertensive disorders as follows: chronic hypertension, gestational hypertension, pre-eclampsia which can be *de novo* or superimposed on chronic hypertension, and the white coat hypertension. This was done after the ISSHP charged a small group of clinician-researchers to provide recommendations about the appropriate classifications. It was the result that there has never been a definite consensus on the classification and diagnostic criteria

for hypertensive disorders. In this study, the researcher used the classification according to the *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) as the one that guides midwives in our country. Knowledge of midwives was assessed by asking the causes of pre-eclampsia where 54.5% answered correctly, the causes remain unknown according to the *Guidelines for Maternity Care in South Africa* (Department of Health, 2016), which indicate that the cure is delivery of the baby. Midwives need to have this knowledge to give education to pregnant women and their families concerning their conditions, which makes it easy to accept the condition and comply to the treatment given.

Fondjo, Boamah & Owiredu (2019) explained that pre-eclampsia is a pregnancy-associated multi-system disorder with no definite aetiology. They indicated that the primary cause is still under investigation. However, some researchers link pre-eclampsia to the impairment of foetal trophoblastic invasion and the release of placental blood-related factors into the maternal circulation. Though the causes are not yet known, the duty of the midwives is to know how to diagnose it and prevent further complications.

Maputle *et al.* (2015) in their study of knowledge towards pregnancy-induced hypertension among pregnant women in Vhembe District, Limpopo Province, indicated that attitudes and beliefs can contribute to the ignorance of the disease, but after education was given there was an improvement. It was established that there is a necessity to have special education with a relevant curriculum for the specific at-risk population and the health system workers. Midwives must give health talks about what is known about the condition because adequate knowledge about a disorder contributes greatly to its prevention, control, and management. Patient's knowledge about a disease has a significant benefit on compliance to treatment and reduce complications. It will benefit both the midwives and pregnant women that after the

midwives have come with the diagnosis and gained cooperation from the client, the necessary intervention can be implemented (Fondjo, 2019).

This study's assessment whether midwives can identify women at risk to develop pre-eclampsia, showed that a 48.1% of the respondents answered correctly. Age is very much important when dealing with hypertensive disorders. Maputle *et al.* (2015) indicated that women at risk are under age 20 or above age of 40. The *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) indicate that even elderly primigravida are likely to develop pre-eclampsia. The midwives should be know this so that they can disseminate the information to pregnant women during their visit to antenatal clinics both at primary health care and hospital levels and encourage early booking for early diagnosis and treatment.

Pre-eclampsia is a condition that happens to women when they are pregnant or in the early postpartum period. Women who are diagnosed with pre-eclampsia have a high blood pressure with one of the following: protein in the urine, low platelets, fluid in the lung, and neurological changes. Pre-eclampsia can affect any organ system in the body. The kidney and liver are the most at risk for damage. Midwives must be vigilant when working with pregnant women and should be able to detect the condition early before more damage is done (Patel, 2015).

In this study, midwives' knowledge of the signs of imminent eclampsia was assessed, and results identified some gaps because knowing the signs will assist in diagnosing the condition earlier and treating the women as an emergency and further referral done. If action is not taken immediately the disease can progress to eclampsia, which is the dangerous stage of hypertensive disorders, where the patient will present with seizures. France & Muganyizi (2012) in their study, showed that headache, abdominal pain, nausea and vomiting are common during pregnancy whether complicated by

eclampsia, but visual disturbances were not as common in normotensive mothers. The characteristics of headache and visual disturbances can be reasonably distinguished among eclamptic and normotensive women. Visual disturbance is said to be the most ominous for the occurrence of eclamptic fit within twelve hours. General abdominal pains are heterogeneous and not distinguishable among eclamptic and normotensive women.

In this study, effective treatment of pre-eclampsia was assessed and 49% of the respondents knew the effective treatment according to the *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) which indicate that there is no effective method of treatment and the only known cure is delivery of the baby. Early detection and treatment of hypertension until foetal viability and timely delivery will result in reducing death and morbidity from complications associated with pre-eclampsia. De Bellefonds (2019b) showed that that pre-eclampsia does not go away until the baby is born. The important thing is to prevent pre-eclampsia from progressing to a more serious condition like eclampsia or HELLP syndrome. Other than delivering the baby, treatments to manage pre-eclampsia depend on the severity of the condition. This knowledge is very critical for midwives to know to reassure the patient and be able to teach them about their condition for them to comply and to be aware of the complications that follow. Midwives become the primary source to give information to pregnant women (De Bellefonds,2019b).

In response to the question "Complication of hypertensive disorders can be prevented by what?", 97.4% responded correctly by indicating that early detection and timely intervention can prevent further complications. Midwives showed understanding in answering the prevention of complications in hypertensive. At the primary level, midwives know the referral systems to the next level in order to prevent complications by letting the patient get care immediately without delay.

The *Queensland Clinical Guidelines* (2016) indicate that without early intervention of hypertensive disorders, adverse perinatal outcome can result. These include: cerebral injury, as cerebral pressure perfusion is altered in pregnant women making them more susceptible to cerebral haemorrhage, posterior reversible encephalopathy, deaths, placental abruption, hepatic failure, and acute renal failure. In knowing all these complications, midwives are bound to treat hypertensive disorders as an emergency. Midwives showed to be knowledgeable in this matter.

Magee *et al.* (2014) indicated that the ISSHP concluded that all cases of pre-eclampsia should be treated with the knowledge that the condition can change rapidly and that world-wide this remains a major cause of maternal death. The report shows that there are still avoidable factors in the management of hypertensive disorders per level of care for health professionals. At the primary level of care, assessment and diagnosis were the main problems while not adhering to the standard protocols was the biggest problem at the hospitals where specialists should be present. The data showed that management of hypertensive disorders is a problem at all levels of care, that is the reason why the Hypertensive Disorders guidelines were reviewed and re-written according to the agreed format to ensure that they are comprehensive covering all levels of care (Moodley *et al.*, 2019).

Midwives responded well when it comes to the drug of choice when there is eclampsia because it was 100% correct, which showed that midwives know which treatment to be used for eclampsia. Eclampsia being the most dangerous to both mother and baby, it is reassuring when all midwives know the drug of choice. Sibai (2013) said that Magnesium Sulphate is the drug of choice to prevent convulsions in women with eclampsia, and further indicate that there is also solid evidence to treat severe hypertension and to use Magnesium Sulphate as prophylaxis against convulsions in women with severe disease, like imminent eclampsia and severe pre-eclampsia.

Stellenberg & Ngwekazi (2016) in their study about knowledge of midwives about hypertensive disorders during pregnancy in primary health care indicated that midwives should not only be updated in theoretical knowledge, but their clinical skills should be upgraded to ensure competence and have confidence in the diagnosis of hypertensive disorder during pregnancy. The results of their study showed a gap in the knowledge of hypertensive disorders, even in this study, gaps are still prevalent concerning the theoretical knowledge.

4.8.3 Skills of Diagnosing Hypertensive Disorders

Knowing how to put theory into practice is very critical in nursing. Midwives must have the required knowledge about the specific avoidable conditions during pregnancy. This will enable them to assess, diagnose and manage pregnant women efficiently and effectively. Midwives must show how to measure blood pressure correctly in pregnant women as it has an impact on the clinical findings. Measurement of blood pressure was done by enrolled nursing assistants, in most cases where some have little knowledge on the dangers of elevated blood pressure in pregnancy. Midwives are always burdened with assessments and deliveries and other responsibilities, but some still remember how to measure blood pressure the correct way.

DuToit (2013) indicated that there seems to be limited information on the knowledge and skills of nurses in South Africa regarding the correct measurement of blood pressure when using a sphygmomanometer and auscultatory methods. Because of the advanced technology in most facilities, sphygmomanometer is no longer used but automated devices. In this study, all facilities used automated blood pressure devices. According to the *South Australian Perinatal Practice Guidelines*, a mercury sphygmomanometer is recommended for blood pressure measurement during pregnancy to detect hypertension. Automated blood pressure devices are used, which

require calibrating at regular intervals. Knowing how long the patient rested should come before measuring blood pressure, but not all the respondents knew the right answer, which is a basic skill in nursing. Accurate blood pressure measurement is fundamental to early diagnosis, guiding also diagnosis, admission, antihypertensive treatment, and timing of delivery. It is therefore important that all health care providers are aware of the issues surrounding the accuracy of BP measurement in pregnancy (Nathan, Duhig, Hazelgrave, Chappell & Shennan, 2015).

Respondents were able to indicate the position of the arm during the measurement of blood pressure, but only 63% answered it correctly, which indicates that midwives must consider it to position the woman correctly when measuring blood pressure, which has an impact on the results. Blood pressure measurement influences diagnosing. BP measurement is taught in South Africa in the first-year training at either university or college level. BP monitoring falls under the scope of midwives and the lower category, that is, enrolled nurses and enrolled nursing assists, but the interpretation and management of results are specifically included in the training of registered nurses (Du Toit, 2013).

Respondents showed understanding in diagnosing severe pre-eclampsia, which is one of the classifications of hypertensive disorders—80% answered correctly. Sibai (2003) in his study of diagnosing and management of gestational hypertension and pre-eclampsia, defined pre-eclampsia as gestational hypertension plus proteinuria, the aetiology is unknown. The rate of pre-eclampsia ranges between 2% and 7% in health nulliparous women and the rate is substantially higher in women with twin gestation (14%) and those with previous pre-eclampsia. In this study, midwives showed an understanding that diagnosing pre-eclampsia earlier can reduce the risk of complications such as pulmonary oedema, acute renal or liver failure, liver haemorrhage, disseminated intravascular coagulopathy and stroke.

Knowing when the BP develops plays an important role, as early diagnosis always results in early intervention and prevention of complications and deaths. 75% of midwives responded correctly in knowing when the blood pressure develops. The *Guidelines for Maternity Care in South Africa* (Department of Health, 2016) show that when measuring BP, caution should be taken and always being aware that increase in BP levels of >30 mmHg systolic and a rise in the diastolic of more than 15 mmHg over BP values taken at the first booking visit, may indicate the development of hypertension. These come with understanding even how to correctly measure the BP.

Laura *et al.* (2014) in their clinical practice guideline recommended that when measuring BP, the women should be in sitting with the arm at the level of the heart, correct cuff size if BP is consistently higher in one arm, the arm with higher values should be used for all blood pressure measurements, BP can be measured using a mercury sphygmomanometer calibrated aneroid device, or an automated blood pressure machine that has been validated for use in pre-eclampsia, and automated blood pressure machines that have not been validated for use in women with pre-eclampsia may underestimate or overestimate blood pressure in those women, a comparison of readings using the mercury sphygmomanometer or calibrated aneroid device is recommended.

Health care professionals should be aware of the advantage and disadvantages of the various BP devices available and feel confident to raise concern regarding devices inaccurate for use in pregnancy or poor technique observed. As there is a particular concern that automated devices tend to underestimate BP in women with pre-eclampsia resulting in the false classification of normotension in these high-risk women. This is thought to be due to specific pathological changes of pre-eclampsia, including decreased arterial vascular compliance and increased interstitial oedema which may affect the amplitude and detection of oscillometer waveforms (Nathan et.,

2015).

History taking plays an important role in diagnosing hypertension in pregnancy and midwives responded positively by showing understanding, as it contributes in making the proper diagnosis. The first antenatal visit is very important in a pregnant woman because the complete assessment of gestational age and risk factors can be made at the first antenatal visit. History can be of assistance if full and relevant history can be done. It can include the following in a pregnant woman: current pregnancy, previous pregnancy, any complications, and outcomes. Medical conditions, including psychiatric problems, and previous operations, familial and genetic disorders, allergies, use of medications, use of alcohol, tobacco, and other substances, family and social circumstances (Department of Health, 2016).

During history taking midwives must consider the following points to gain the cooperation of the client: should be accepting and non-judgmental, use empathy, be supportive, and be careful with sensitive issues and potentially embarrassing or disturbing topics. Because history often repeats itself, previous antenatal, intrapartum or postpartum complications should influence the management of the recent pregnancy (Naz, 2012).

Midwives showed good interpretation of the results of urinalysis, which forms part of diagnosing hypertensive disorders. Midwives should be able to know how to read the results of urinalysis even knowing the waiting period before reading the results. Several studies have found that urinary dipstick determinations correlate poorly with the amount of proteinuria found in 24-hour urine determinations in a woman with gestational hypertension. The urine dipstick measurement used to establish proteinuria should be no more than seven days apart (Sibai, 2003). Brown *et al.* (2001), indicated that the *Queensland Guidelines* (2015) showed that urinalysis

should be a guide for further testing as it has a high rate of both false positives and negatives. Abnormal proteinuria is most certain when measured in a timed collection >300mg/day considered abnormal for pregnancy. Spot urine protein/creatinine ratio >30mg protein/mmol creatinine is another alternative, superior to qualitative (dipstick) evaluation alone and equivalent to 24-hour urine collection.

Midwives were asked to identify the blood investigations needed to diagnose hypertensive disorders, and 75% answered correctly. Midwives working in health care centres showed a gap in knowing the investigations to be done and to interpret the abnormal results because with the complicated cases they have to refer to the hospitals immediately, but when compared to the midwives working in hospital settings most of them answered correctly because of their exposure in a hospital setting where they have laboratory which is working 24 hours and learning even more from doctors as they work with them on daily basis. Blood investigations usually identify the signs of organ dysfunction, where there is the presence of haemolysis, elevated liver enzymes, and low platelets, which will need to be attended to immediately to save both mother and baby.

Stellenburg & Ngwekazi (2016) indicated in South Africa, most of the pregnancy-related care is delivered by midwives at maternity obstetric units based at the primary health care level. They indicated aggressive measures should be introduced and action is required to improve the knowledge of midwives at the primary health care level. They concluded that poor knowledge about hypertensive disorders and not being able to diagnose and assess a patient with hypertensive disorders should not be tolerated for quality and safe midwifery practice. Midwives should be able to identify the signs of imminent eclampsia which are: severe headache, visual disturbances, epigastric pain, hyperreflexia, clonus, dizziness, vomiting, and fainting. Haematological complications include thrombocytopenia. They showed

understanding because 96% responded positively. There is the critical stage of hypertensive disorders, where action must be taken to prevent eclampsia, which is the generalised tonic-clonic (Steyn, 2013). In this study, the midwives showed understanding in these parts of diagnosing by knowing the signs of the imminent eclampsia, which when missed can progress to eclampsia and that is the reason early diagnosis is very important. Both the midwives in primary health care and hospital settings responded well.

Midwives must indicate which results needed attention where 52% answered correctly, implying that there is still a gap in knowing the abnormal results. Midwives must be able to interpret results in a hospital setting and be able to give necessary treatment according to the standing orders before the doctor arrives (Department of Health, 2016).

4.8.4   Nursing Action Taken by Midwives

Midwives are the primary contacts who manage all uncomplicated pregnancies and refer complications to the next level. In responding on what to do in health centres when nursing pre-eclampsia, 93.5% responded correctly which indicates that they understand their roles as midwives at the health centres and that to prevent complications there must be referrals immediately. The study revealed improvement in the referral of hypertensive disorders to the next level. In health centres unlike in the hospital settings, the doctors are not always available, midwives have to take actions that will save lives as guided by protocols. Thein *et al.* (2012) indicated that well-trained and skilled midwives could provide essential maternal care ensuring universal coverage of maternal services.

Moodley *et al.* (2019) concluded that directors must ensure that all clinics have protocols and guidelines, including referrals. They must ensure that protocols derived

from guidelines are available at each clinic and labour wards. Midwives are practicing under the scope of practice guided by the SANC, the respondents showed that they know when to give standing orders and come up with the nursing diagnosis.

The protocols explain which treatment should be given to the patient with severe pre-eclampsia, midwives in health centre have to identify which treatment is effective to stabilize the patient before they transfer to a higher level of care. Of the respondents, 93% answered correctly which gave the picture of what midwives are doing at the primary health care level. These show that majority of midwives are doing well around knowing the drugs of choice. All health centres and clinics in Vhembe District are provided with guidelines on how to manage all conditions before referrals. Magnesium Sulphate is the anticonvulsant drug of choice for the prevention and treatment of eclampsia, the drug is now given at the primary health centre which assists in stabilising the patient with imminent eclampsia, eclampsia, and HELLP syndrome before referral (Queensland Clinical Guidelines, 2016).

Midwives must indicate the duty of the midwives who are working at the hospital setting when nursing imminent eclampsia and 89% answered correctly which shows that they understand their responsibility of stabilising the patient before the doctor comes. Midwives must know how to administer Magnesium Sulphate accordingly. Fadlala, Khalil, Taha & Gassmalla (2019) in their study of awareness of nurse-midwives regarding administering Magnesium Sulphate to preeclamptic and eclamptic mothers, identified gaps in the knowledge of midwives about Magnesium Sulphate, including administration and parameters of monitoring the patient. In some hospitals they have sessions for doctors, who stay away from the hospital, when called they can take some time to arrive at the hospital for an emergency, that is the reason for this study in assessing midwives' knowledge in diagnosing hypertensive disorders in pregnancy. Knowing what to do and how to do it gives confidence when dealing with

obstetric emergencies, like imminent eclampsia and eclampsia. Midwives operate under the scope of practice regulated by the SANC, which provides parameters for the regulation of all actions taken by them (Du Toit, 2013).

The scope of practice of a registered midwife entails the diagnosing of a health need and the facilitation of the attainment of the optimum physical and mental health for mother and child by prescribing, provisioning, and executing of a midwifery regimen, and thus prevention of disease relating to pregnancy. Midwives were assessed if their scope allows them to diagnose, and 89% answered correctly according to what the scope of midwifery entails. Midwives must know the boundaries in their practice as recommended by SANC, in terms of Section 45(1)(q) of the Nursing Act,1978 (Act 50 of 1978).

The *Council for Nurses and Midwives* in Malta (2020) indicate that nurses and midwives need to ensure that they work within their professional boundaries. The important thing is that nurses and midwives have to acknowledge that they cannot provide all the care needs, they have to be reflective of their practice, being aware of any warning signs that may suggest over or under involvement in the provision of patient care. The maintenance of professional boundaries by midwives is a demonstration of accountability and responsibility for one's practice as prescribed in the Code of Ethics and Standards of Professional Conduct for Nurses and midwives.

4.8.5 Observational Checklist (Blood Pressure Measurement and Urinalysis Techniques)

The researcher performed an observational checklist in blood pressure and urinalysis, which was both known and unknown to the nurses. Nurses in the observation area, where blood pressure is measured, were observed how they measured the blood pressure because the way blood pressure is measured determines even the results.

What the researcher was observing in blood pressure measurement was the,position and comfort of the patient, explanation of the procedure to the patient, ask about factors affecting BP (anxiety, exercise, etc.), using appropriate cuff size (length 1.5 times the circumference of the arm), arm at the heart level during measurement and the action taken after measuring including abnormal findings (Magee *et al.*, 2014). A study done by Du Toit (2013), indicated that the patient must be in a comfortable position, informed that BP is going to be measured and need to rest at least 5 minutes to prepare the patient and for the correct outcome of the results. Because when the procedure is not told, the patient can be anxious and this affects the results.

In this study, the vital signs in the facilities are done mostly by the lower categories and not by the midwives, because of the workload and shortage of midwives. The staff ratio does not correlate with the number of patients being seen in the facility. Short staffing compromises care and results in increased staff stress, reduce staff well-being, causes high levels of burnout, more staff are leaving due to lower job satisfaction (Douglas, 2011).

In developed countries, they consider self-monitoring of BP in pregnancy and indicated that it is feasible and has the potential to be useful in the early detection of gestational hypertensive disorders, but maintaining self-monitoring throughout pregnancy requires support and probably enhanced training. The readings of self-monitoring are always compared with the clinic monitoring to make a diagnosis. These can reduce the workload of the midwives as they will be having a baseline. In this study, it is not possible as most of our people are not working and some are illiterate (Tucker, Taylor & McManus, 2017).

4.8.5.1 The Findings of Observing Blood Pressure Measurement

Techniques in BP measurements were not followed correctly because of the overload

on nurses, there is no informing of the patient that they are going to measure BP in most of the facilities. No resting period after the patient arrived at the facility was observed. The correct size of cuffs was used. Findings were documented. In all institutions, junior nurses are responsible for taking BP and report the results to the midwives. In district and referral hospitals where large number of patients are seen in a day, those measures were not considered as nurses have long queues for measuring blood pressure, more especially on a high-risk day when many pregnant women who cannot be monitored at the clinic level because of their condition referred to the hospital for monitoring and specialist intervention. The classification of hospitals is based on the level of functioning and includes the type of health professionals that can be employed at a facility (*Guidelines for Maternity Care in South Africa,* Department of Health, 2016).

Many extraneous variables are known to influence BP which should be considered always when measuring BP. Patients' activity, emotions, and environmental stressors, a physiological variable like pain, must be considered always and every effort should be made to minimize the variables because if they go unrecognized, errors in diagnosing and management can occur (Du Toit, 2013). Brown *et al.* (2001) explained that blood pressure is ideally recorded using both arms at the first antenatal visit, and if there is little difference, the right arm should be utilized thereafter. Detection of significant differences requires referral to an expert. There is a challenge where the queue is very long and nurses will be considering the burden before them. Midwives should be aware that the increases in BP levels of >30 mmHg systolic and or arise in the diastolic of more than 15 mmHg overvalues taken at the first booking may indicate the development of hypertension, even if the blood pressure is not yet in the hypertensive range. Midwives need to be sensitive with these as it can assist in early diagnosis at the early stage of pregnancy. In this study, challenges of missing this

point, is the shortage of staff, where they are overburdened with work (Department of Health, 2016).

4.8.5.2 The Findings of Observing Urinalysis

In observing nurses during urinalysis, the researcher must check that the urine dipstick is done using clean utensils. The waiting period of one minute is adhered to. Urinalysis techniques were done in clean utensils in some of the facilities, but in some cases where they do not have enough utensils, rinsing after use was done and re-used by the next patient. Where resources are available the used utensils must be soaked and washed thoroughly with detergents before used. A waiting period of reading results does not adhere to, more especially during high-risk clinic where there are many patients with few nurses. Moodley *et al.* (2019) indicated that without resources, like urine dipstick, there can be no effective screening for hypertensive disorders.

In the revised guideline for hypertensive disorders, they came with solutions that inspection is done by coordinators for the sub-district to check every month the number of functioning blood pressure machines, availability of urine dipsticks, and to make sure that the protocol for hypertensive disorders is prominently displayed. These will reduce the problems of women not being fully screened because of not having urine dipsticks, and also reduce the unnecessary transfers to the hospital for the shortage of resources at the primary health care (Moodley *et al.*, 2019).

In urinalysis, routine and microscopy without additional tests for proteinuria, in women with other conditions midwives have to note that, proteinuria is usually absent in secondary causes of hypertension such as pheochromocytoma, thyrotoxicosis, coarctation of the aorta, and withdrawal syndrome. It is very important for midwives not to rely on one investigation to make a final diagnosis of hypertensive disorders (Magee *et al.*, 2014).

The problem that was identified during observation is the nurse-patient ratio, where nurses must nurse more patients with limited staff. Urinalysis is done by junior nurses who report the findings to the midwives. Urinalysis has to be done correctly and accurately and in a clean utensil as it also forms part of diagnosing hypertensive disorders. Proteinuria (spot urine protein/creatinine>30 mg/mmol or >300 mg/day at least 1 g/L (2+) on dipstick testing. Proteinuria turns out to be the first feature of pre-eclampsia which is defined when subsequently the blood pressure rises, or other features of pre-eclampsia develop (Bilkan, Gilbert & Ryan, 2014).

De Ballefonds (2019a) indicated that urine tests during pregnancy can also detect other conditions and indicated three of pregnancy's more common complications, that are gestational diabetes, pre-eclampsia, and urinary tract infections, all of which have markers that show up in urine. These can be indicated by having a high level of glucose in the urine may indicate pre-existing type 2 diabetes, protein in urine sometimes pre-eclampsia, but protein can indicate kidney infection or chronic kidney disease. When proteinuria develops later in pregnancy, it can be an early sign of pre-eclampsia, and red or white blood cells in urine may be a sign of urinary tract infection. These call the midwives to always to make follow up in findings of the results.

❖ **In testing the urine, the following are recommended:**

❊ Wipe the labia clean, from front to back,

❊ Start urinating in the toilet,

❊ Catch the urine midstream, and

❊ Continue filling to the mark indicated.

This is done to prevent the sample from being contaminated with bacteria or other

secretions that may invalidate the results. The midwives and the nurses working with midwives must give health talk to all patients before the procedures are done. In this study, the time for giving education to the pregnant women concerning urinalysis was not there because of the long queue with the limited number of staff. These always bring a compromise to the nursing care of patients because nurses want to push the queue and finish the clients in time. Sometimes even the waiting period of reading results cannot be adhered to (De Bellefonds, 2019a).

4.9   Summary

Data were analysed and summarised in tables and graphs indicating the percentage of the respondents and their answers. The items from the research instrument's checklist were summarized. The researcher could not generalise about the midwives' knowledge and skills in diagnosing hypertensive disorders in pregnant women in Vhembe District, South Africa, because the population didn't represent the whole Vhembe District. The next chapter will entail the summary, limitations conclusion, and recommendations.

CHAPTER 5

SUMMARY, LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter displayed the results and discussion. In this chapter, a summary of the research will be outlined, as well as limitations of the study, conclusions, and recommendations which were based on the findings of the study. The purpose of the study was to assess midwives' knowledge and skills in diagnosing hypertensive disorders during pregnancy in selected facilities in Vhembe District, Limpopo Province, South Africa.

5.2 Objectives of the Study

5.2.1 To Assess the Knowledge of the Midwives in Diagnosing Hypertensive Disorders in Vhembe District, South Africa

Self-developed questionnaires were used to assess the midwives' knowledge in diagnosing hypertensive disorders, which comprises a knowledge of hypertension, its classification, causes, women at risk, signs of imminent eclampsia, effective treatment, the drug of choice, and complications and objectives were achieved as the relationship between knowledge, skills, and diagnosis of hypertensive diagnosis in pregnancy was established. The knowledge and skills of midwives play an important role in making a diagnosis, through their assessments, taking of history, interpreting the blood results, giving the drugs of choice according to standing orders, and being able to refer the patient to the hospital. Midwives showed that in some areas like knowledge and skills of hypertensive disorders, they still need updating.

Essential Steps in Managing Obstetric Emergencies (ESMOE) are recommended for every midwife working in a maternity ward for the refreshing of their skills and do fire drills which will help them to practice how to attend to an obstetric emergency.

5.2.2 To Determine the Skills of the Midwives in Diagnosing Hypertensive Disorders in Vhembe District, South Africa

These were achieved by asking how the midwives are diagnosing hypertensive disorders by checking on how blood pressure measurement and urinalysis are done. The waiting period before measuring BP and waiting period on reading results for urinalysis were also assessed. The action taken by midwives in nursing hypertensive disorders and how they are guided by SANC in applying their knowledge was considered indispensable. The observational checklist was also conducted by the researcher to observe midwives' skills of measuring blood pressure and doing urinalysis.

Objectives were achieved by the results that the researcher received from respondents which showed that BP was correctly measured, even though some gaps in the waiting period before measuring and not asking women the factors that can aggravate the rise in blood pressure were identified. By the observational checklist that the researcher conducted, the correct way of doing urinalysis was observed, gap identified was the utensils that were not properly cleaned in some facilities and the waiting period of reading results were not followed.

5.3 Summary

5.3.1 Chapter 1

Chapter 1 is a broad discussion of the study showing why the researcher wanted to research the topic of 'Midwives Knowledge and Skills in Diagnosing Hypertensive Disorders During Pregnancy in Selected Facilities in Vhembe District, South Africa."

The chapter also encompasses the overview of the whole study, where details about the study were presented and a summary of what was to be achieved indicated. The findings will assist in improving quality patient care in our facilities and that midwives' knowledge and skills will be revised.

5.3.2 Chapter 2

Chapter 2 is a comprehensive overview of the literature in an endeavour to contextualise the topic. The researcher used different pieces of literature to support the study and explained what other researchers achieved in the field of research. Headings discussed are as follows: hypertensive disorders, where pathophysiology and classifications of hypertensive disorders were outlined. Complications of hypertensive disorders, the role of the midwife which include history taking, blood pressure measurement, misdiagnosing because of wrong BP measurement, urine testing, blood investigation to be done in hypertensive disorders, interpretation of results, and the challenges that midwives encounter when diagnosing hypertensive disorders which include transportation problems, shortage of were discussed in detail.

5.3.3 Chapter 3

This chapter descrtibed the methodology, where the researcher indicated the research design and method. A quantitative approach was used which was descriptive and explanatory. The population was 194 midwives in selected facilities which include, hospitals and health centres. Self-developed questionnaires were used to collect data from a sample of 77 respondents. The questionnaires consisted of five sections which were done according to the theoretical framework. The observational checklist was the sixth section, which was specifically for the researcher to conduct. Validity and reliability were tested. Ethical measures were adhered to throughout, which were principles of beneficence, human dignity, the principle of justice, and informed

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consent. A plan for dissemination of results was outlined. Data were analysed using SPSS version 25.

5.3.4   Chapter 4

In this chapter, the results and findings were presented and discussed in the form of tables and graphs; discussions were were supported by the literature. Results showed that there are some gaps in midwives' knowledge and skills in diagnosing hypertensive disorders, as not all midwives were able to describe what hypertensive disorders are, not considering the resting period before measuring blood pressure, interpretation of results, and understanding the standing orders as midwives. In the observational checklist, utensils used for urine testing were not thoroughly cleansed which can affect the results, and the waiting period for reading the results was not adhered to.

5.3.5   Chapter 5

In this chapter, the researcher summarised the whole study. The summary of the study and limitations were discussed. Conclusions and recommendations were made based on the outcome of the study. Recommendations were made with regard to Midwifery Practice, Nursing Education, and Nursing Research.

5.4   Limitations of the Study

✳ Data could not be generalised as the study was done on a small scale that does not cover the whole of Vhembe District.

✳ Midwives who did not work in the maternity ward were excluded as they were not exposed to pregnant women on daily basis, and they might be out of touch with recent practices of midwifery, which might have impeded the outcome of the study.

5.5   Conclusion

In this study which assessed knowledge and skills of midwives in diagnosing hypertensive disorders some gaps still exist in the knowledge of the condition of the hypertensive disorder as severe hypertension, imminent eclampsia, eclampsia, and HELLP syndrome must be recognised as life-threatening conditions, requiring urgent attention. All maternity facilities must be able to provide care for hypertensive pregnant women and throughout their antenatal care be able to ensure detection, early referral, and timely delivery. Midwives still need strategies for refreshing their skills, more especially those who are working in primary health care. Nursing is about practicing what you have learned, the more practice is done, the more confidence will be shown when diagnosing and nursing hypertensive disorders.

The use of guidelines for maternity care in South Africa should be adhered to by all midwives in all facilities, as it has directions as to what needs to be done when nursing hypertensive disorders. Midwives must follow protocols, as prescribed according to the level of the institution. The midwives sometimes miss the diagnosis because of work overload. Shortage of staff in maternity wards results in exhaustion and burn-out syndrome can result in missing patients who need urgent care. In diagnosing hypertensive disorders, resources are needed like blood pressure monitors and uristics for urinalysis. Some of the facilities run short of these resources which makes it difficult to diagnose patients with hypertensive disorders.

In-service training should be encouraged regularly in maternity facilities, where midwives get time to revise the knowledge they have and those who are old in the profession should then be able to acquire recent knowledge and practices.

5.6   Recommendations

The study is recommended to be done by future researchers on diagnosing and also the management of hypertensive disorders as little was researched about this condition, to close the gaps that are still there in the knowledge and skills in diagnosing hypertensive disorders in Vhembe District and the country at large.

5.6.1   Midwifery Practice

Midwives should be in the know of diagnosing every hypertensive disorder in antenatal care and be able to intervene immediately to prevent complications. Midwives should not only be updated in theoretical knowledge, but also in their clinical skills to ensure competence. Attendance of national programmes such as the *Essential Steps in the Management of Obstetric Emergencies (EMOE)* and the *Basic Antenatal Care for Primary Health Care Facilities* should be compulsory for all midwives. Training in advanced midwifery and neonatology should continue to have more advanced midwives in all the facilities.

5.6.2   Nursing Education

Curriculum developers in the stream of midwifery should ensure the continuity of knowledge and skills update after training in college and university.

5.6.3   Nursing Research

Future research should address the high foetal and maternal mortality rates. Further research is required on midwifery practices to enable appropriate intervention. Research is recommended on other areas, like complications of hypertensive disorders, burnout syndrome on midwives, and even how to manage hypertensive disorders in pregnancy.

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APPENDIX A

UVREC CLEARANCE CERTIFICATE

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Mrs CS Mkansi

Student No:
17023767

PROJECT TITLE: **Midwives knowledge and skills of diagnosing hypertensive disorders during pregnancy at selected health facilities in Vhembe District, South Africa.**

PROJECT NO: **SHS/19/PDC/29/2708**

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof MS Maputle	University of Venda	Supervisor
Dr SA Mulondo	University of Venda	Co- Supervisor
Mrs CS Mkansi	University of Venda	Investigator – Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: August 2019
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: ....
Name of the Chairperson of the Committee: Senior Prof. G.E. Ekosse

UNIVERSITY OF VENDA
DIRECTOR
RESEARCH AND INNOVATION
2019 -09- 0 4
Private Bag X5050
Thohoyandou 0950

University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 0950, LIMPOPO PROVINCE, SOUTH AFRICA
TELEPHONE (015) 962 8504/8313 FAX (015) 962 9060
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APPENDIX B

REQUEST TO LIMPOPO PROVINCE DEPARTMENT OF HEALTH TO CONDUCT THE STUDY

Box 2058
18 College Street
Elim Hospital
0960
Department of Health
Research Unit
Polokwane
0700

Dear Sir/Madam

Application to Conduct Research

I hereby request permission to conduct research at Tshilidzini Hospital, Elim Hospital, Malamulele Hospital, and Louis Trichardt Memorial Hospital. Bungeni Makhado, Mphambo and Tshilwavhusiku health centres in Vhembe District, South Africa.

I am a student in the University of Venda doing a Master's Degree in Health Sciences. My research topic is: "Midwives' knowledge of diagnosing hypertensive disorder in pregnancy in selected hospital in Vhembe District in Limpopo Province."

Questionnaires will be used for collection of information from midwives working in maternity ward. Ethical clearance certificate attached.

Thanking you in advance

Yours faithfully

C.S. Mkansi

Student no.17023676

Contact no. 082 665 8939

APPENDIX C

PERMISSION FROM THE LIMPOPO PROVINCE DEPARTMENT OF HEALTH TO CONDUCT THE STUDY

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

Department of Health

Ref	:	LP-201910 - 012
Enquires	:	Ms PF Mahlokwane
Tel	:	015-293 6028
Email	:	Kurhula.Hlomane@dhsd.limpopo.gov.za

Chuki Mkansi

PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES

Your Study Topic as indicated below;

Midwives knowledge and skills of diagnosing hypertensive disorders during pregnancy at selected health facilities in Vhembe district, South Africa.

1. Permission to conduct research study as per your research proposal is hereby Granted.
2. Kindly note the following:
   a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
   b. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
   c. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   d. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   e. The approval is only valid for a 1-year period.
   f. If the proposal has been amended, a new approval should be sought from the Department of Health
   g. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

Head of Department   Date   25/11/19

Private Bag X9302 Polokwane
Fidel Castro Ruz House, 18 College Street, Polokwane 0700. Tel: 015 293 6000/12. Fax: 015 293 6211.
Website: http/www.limpopo.gov.za

University of Venda

APPENDIX D

LETTER TO VHEMBE DISTRICT MANAGER

Box 2058

Elim Hospital

0960

To the District Manager

Request for Permission to Conducting Research in the Facility

Dear Madam/Sir

I hereby requesting a permission to conduct a research in maternity ward at your hospital. I am student in the University of Venda doing Masters Degree in Nursing. My research topic is "Midwives' knowledge and skills of diagnosing of hypertensive disorders in pregnancy in selected facilities in Vhembe District, South Africa."

A Questionnaire will be used for collection of information from midwives working in maternity wards.

I will appreciate if my request can be taken into consideration, thanking you in advance.
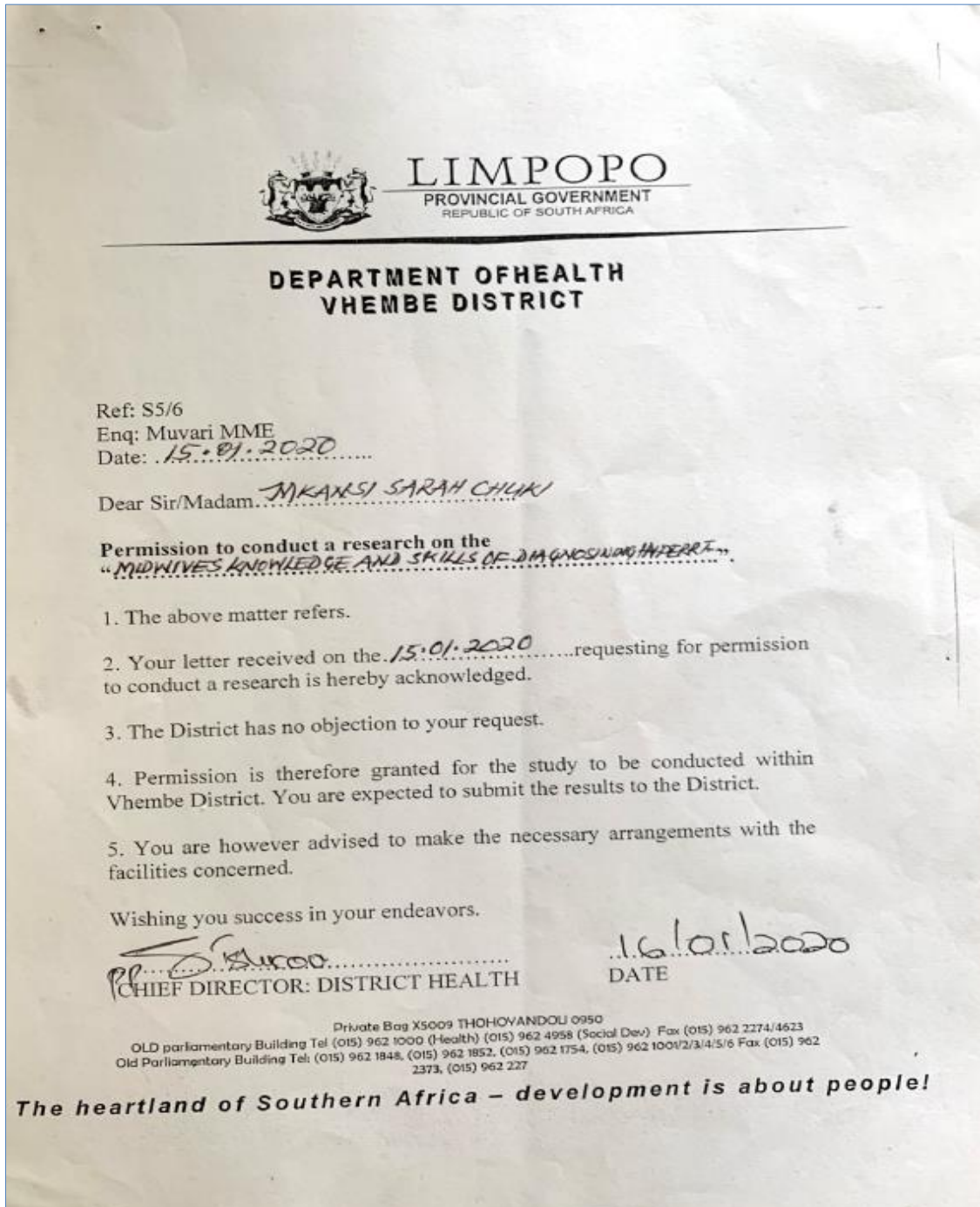
Yours Faithfully

Chuki Mkansi

Student no: 17023767

Contact no. 082 665 8939

APPENDIX E

PERMISSION FROM VHEMBE DISTRICT MANAGER

APPENDIX F

LETTER OF INFORMATION

Title of the Research Study:
Midwives' knowledge and skills of diagnosing hypertensive disorders during pregnancy in selected facilities in Vhembe District, South Africa.

Principal Investigator/s/ researcher:
Chuki Sarah Mkansi, Masters' degree in Nursing Science

Co-Investigator/s/supervisor/s:
Professor Maputle S –Supervisor
Dr Mulondo S –Co-Supervisor

Brief Introduction and Purpose of the Study:
Knowledge and skills of midwives play an important role in diagnosis of hypertensive disorder thus preventing complications of hypertensive disorder in pregnancy by proper history taking blood pressure measurement and urinalysis with the interpretation of the results. Purpose is to determine knowledge by midwives in diagnosing hypertensive disorder in pregnancy.

Outline of the Procedures:
All participants are expected to give the consent before the procedure, after the researcher has fully disclose every important information about the study. The researcher will arrange with the hospital managers for the venue conducive for answering questionnaires. Midwives with six-month experience and above, advance midwives working in maternity ward will be included in the research. The questionnaire will have twenty questions to be answered in English. The researcher will hand over the questionnaires and explain to the participant what is expected. 30-45 minutes will be allocated for anwering.A fter the completion the researcher will collect all questionnaire.

Risks or Discomforts to the Participant:
There will be no foreseeable risk or discomfort for participants.

Benefits:
The study will be of benefit to other researcher as it will be published as journals by the University.

Reason/s why the Participant May Be Withdrawn from the Study:
Participants has right to voluntarily decide to participate on study or not without any penalties. Participants has right to withdraw participation or refuse to provide any information where they are not comfortable.

Remuneration:
There will be remunerations for participants.

Costs of the Study:
No costs of the study from participants.
Confidentiality:
The confidentiality will be maintained by anonymity and to keep the information collected in strict confidence. The researcher will not be able to link the participants with the information received as there will be no names needed.

Research-related Injury:
The study doesn't expose participants to injuries nor adverse reaction because there is no treatment.

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher at 0826658939, my supervisor Professor Maputle S at 0846022063 and Dr Mulodo at 0796005596 or the University Research Ethics Committee Secretariat on 015 962 9058. Complaints can be reported to the Director: Research and Innovation, Prof GE Ekosse on 015 962 8313 or Georges Ivo.Ekosse@univen.ac.z

APPENDIX G

CONSENT FORM

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Chuki Sarah Mkansi, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **SHS/19/PDC/29/2708**
- I have also received, read and understood the above written information (*Participant Letter of Information*) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant	Date	Time	Signature
……………………………	……………………………	……………………………	……………………………

I, Chuki Sarah Mkansi, herewith confirm that the above participant has been fully Informed about the nature, conduct and risks of the above study.

Full Name of Researcher	Date	Time	Signature
Chuki Sarah Mkansi	……………………………	……………………………	……………………………

Full Name of Witness	Date	Time	Signature
……………………………	……………………………	……………………………	……………………………

Full Name of Legal Guardian (if applicable)	Date	Time	Signature
……………………………	……………………………	……………………………	……………………………

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APPENDIX H

QUESTIONNAIRE

Instructions

- Please read carefully and answer all questions
- Do not write your name or number
- Please, feel free to contact me if you experience any difficulties in answering the questionnaire.

Tick the response which is appropriate to you:

A. Biographic data				
1. **Age**	20-29	30-39	40-49	50-59, 60-65(combined)
2. **Gender**	Male	Female		
3. **Race**	African	White	Coloured	Indian or other
4. **Years of experience in maternity ward**	Less than 6 months	6 months and above		
5. **Years of experience as a professional nurse**	1	2	3	4 and above
6. **Facility**	Hospital	Health centre		
7. **Are you a midwife or an advance midwife**	Midwife	Advanced midwife		
B. Knowledge about hypertensive disorders: Tick the correct answer				
8. **Hypertensive disorders are**	1. Most common cause of maternal mortality	2. Responsible for significant perinatal and maternal morbidity	3. Include chronic hypertension	4. All of the above
9. **Hypertension is**	1. Persistent high blood pressure	2. Systolic of 120	3. Systolic of 70	4. All of the above
10. **Hypertensive disorder in pregnancy include**	Chronic hypertension	Pre-eclampsia	HELLP syndrome	All of the above
11. **Hypertensive disorders; include**	Chronic hypertension.	Gestational hypertension	Pre-eclampsia	All of the above

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12.	Causes of Pre-eclampsia	Unknown	Eating lot of salt	Late booking	None of the abo
13.	Women at risk to develop pre-Eclampsia	35 years and above	Less appetite	Illiterate women	None of the above
14.	Signs of imminent Eclampsia include	Dizziness	Severe headache	Visual disturbance	All of the above
15.	Effective method of treatment and cure of pre-Eclampsia	Attend antenatal clinic	Delivery of the baby	Bed rest	Low salt diet
16.	Drug of choice when n there is Eclampsia	Magnesium sulphate	Paracetamol	Valium	None of the above
17.	Complication of hypertensive disorder can be prevented by	Early detection and timely intervention	Exercising	Bed rest	None of the above
C. Know How: Skills of diagnosing Hypertensive disorders: Tick the correct answer					
18.	How long should patient rest before BP measurement	5 minutes	3-4 minutes	1-2minutes	Unnecessary to rest
19.	What should be the position of the arm be during BP measurement?	Under heart level	Above heart level	At heart level	Not necessary
20.	Which BP readings shows severe pre-Eclampsia	Diastolic BP of _> 110, and systolic of greater of 160 mmHg	Systolic diastolic of 140 and diastolic of 90 mmHg	Systolic of 120 and diastolic of 60 mmHg	All of the above
21.	Increase of BP levels of .30 mmHg systolic and 15mmHg over the values at first booking indicate:	The development of hypertension	The normal progress of pregnancy.	That there is eclampsia	None of the above
22.	History taking can include asking:	Current information	Previous pregnancies	Medical conditions	All of the above
23.	What are the signs of imminent Eclampsia, that patient can verbalise?	Severe headache	Blurred vision	Epigastric pain	All of the above
24.	Proper history taking can contribute in	Making proper diagnosis	Giving relevant treatment	Nursing patient in totality	All of the above

25. Which results in urine dipstick suggests development of hypertension	Protein in urine	Glucose in urine	Ketones in urine	None of the above
26. HELLP syndrome is	Presence of haemolysis	Elevated liver enzymes	Low platelets	All of the above
27. What are the baseline blood investigation to be done?	FBC, LFT, Uric acid,	FBC, Urea and Electrolytes (U&E)	FBC, HIV	FBC, random glucose
28. Which result needs attention?	Elevated liver enzymes, Low platelets. Raised uric acid	Decreased liver enzymes, elevated platelets	None of the above	All of the above
D. Show How: Nursing action taken by midwives				
29. What is the duty of the midwife in health centre in nursing pre-eclampsia	Give treatment according to the standing order and transfer the patient	Give treatment according to standing order and admit at the health centre	Transfer the patient immediately without given any treatment	None of the above
30. Which treatment is to be given at the clinic according to the guideline	Aldomet up to 1g Magnesium sulphate regime Adalat	Aldomet, Labetolol Magnesium sulphate regime	No treatment is to be given at the clinic	Valium injection
31. Responsibility of the midwife at the hospital when nursing patient with imminent Eclampsia	Stabilize the patient by giving treatment according to the guideline and report to the doctor	Call the doctor without giving any treatment	Monitor blood pressure without giving treatment	None of the above
32. Responsibility of district hospital in nursing severe pre-Eclampsia	Stabilize the patient and keep in the ward	Stabilize the patient and transfer to a specialist centre	Involve psychologist to counsel the patient	To consider deliver the women through C/Section.
E. Does:.Applying Knowledge in Practice and Scope of Practice of Midwives Guided y SANC.				
33. What is the drug of choice of managing eclamptic patient	Magnesium sulphate regime	Labetolol	Pethidine	Promethazine
Answer YES or NO				
34. Can a midwife give standing orders treatment before the doctor prescribe?	Yes	No		

35. Does the scope of midwives allow diagnosis by midwives?	Yes	No		
BLOOD PRESSURE AND URINALYSIS TECHNIQUES **OBSERVATIONAL CHECKLIST BY THE RESEARCHER**				
Observation	**Yes**	**No**	**Comments**	
Patient in comfortable position				
Patient informed that BP is going to be measured				
Ask about factors affecting BP (anxiety, exercise, coffee)				
Rest at least 5 minutes prior to reading BP				
Using appropriate cuff size				
Arm at heart level during BP measurement				
Action taken with abnormal BP				
Urine dipstick is done using clean utensils				
After dipping the sticks, waiting period for 1 minute adhered to				

APPENDIX I

LANGUAGE EDITING AND PROOFREADING CERTIFICATE

CONFIRMATION BY LANGUAGE EDITOR

Prof Donavon C. Hiss

Cell: 072 200 1086 | E-mail: hissdc@gmail.com or | dhiss@outlook.com

12 March 2021

To Whom It May Concern

This serves to confirm that I have edited the language, spelling, grammar and style of the **Masters in Nursing Science** thesis by **Chuki Sarah Mkansi**, titled: "**Midwives' Knowledge and Skills of Diagnosing Hypertensive Disorders During Pregnancy in Selected Facilities in Vhembe District, South Africa**" The manuscript was also professionally typeset by me.

Sincerely Yours

Cert. Freelance Journalism, Dip. Creative Writing, MSc (Medicine), PhD

University of Venda