MIDWIVES' USE OF SYMPHYSIS FUNDAL HEIGHT MEASUREMENT TO MONITOR FOETAL GROWTH IN ETHEKWINI DISTRICT, KWAZULU-NATAL

Londiwe Zibuyile Dlamini
21441940

Dissertation submitted in fulfilment of the requirements for the Degree in Master of Health Sciences in Nursing in the Faculty of Health Sciences at the Durban University of Technology

Supervisor: Professor T. S. P. Ngxongo

Co-supervisor: N/A

Date: November 2022

DECLARATION

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

09/12/2022

Signature of student Date

Approved for final submission

09/12/2022

Prof. T. S. P. Ngxongo Date

RN, RM, D Nursing

DEDICATION

I dedicate this dissertation to the Lord almighty who gave me the strength to complete my Master's degree, this journey wasn't easy but it was worth it. I also want to send gratitude to my parents, Mr Sbongakonke and Mrs Dorah Sibiya who both believed in me throughout my studies. Your love and support means a lot to me.

"With God all things are possible" Matthew 19:26

ACKNOWLEDGEMENTS

I would also like to express my sincere gratitude to the following:

Prof. T. S. P. Ngxongo, my supervisor for encouraging wise words and who believed in me, thank you so much Prof. I wouldn't have done this without you, I will respect you forever.

The Department of Nursing at Durban University of Technology and the research team, especially Dr Sokhela. Thank you so much for your support.

Durban University of Technology Research Ethics Committee, thank you for approving my study under the name of this higher education institution.

My gratitude to eThekwini Municipality Health Unit research committee for granting me gatekeeper permission to conduct my study in their clinical facilities.

To the midwives who participated in my study and the pregnant women who gave me consent to review their maternity case records.

I thank my Husband, Khulekani Dlamini, who supported me throughout this journey by taking good care of our kids while I was busy with my study. Your love and support is highly appreciated.

My children, Snethemba and Yandisa who always asked me "Mommy when are you finishing your Masters' dissertation?" Thank you so much for your support guys, I hope my achievement will encourage both of you.

To my manager from Department of Correctional Services, Sister T. D. N. Hlongwa who always gave me support and approved my study leave, I cannot thank you enough but only God can bless you.

ABSTRACT

Introduction and background: Ending preventable death of new-borns and children under 5 years of age by 2030 is one of the Sustainable Development Goals. Assessment of foetal growth by symphysis fundal height (SFH) measurement is one of the aims of antenatal care (ANC) and is used as the screening tool of choice for foetal growth assessment to identify small and large for gestational age foetuses at increased risk of perinatal morbidity and mortality. Correct estimation of gestational age allows for proper scheduling of ANC visits, informs decision-making at different stages of pregnancy, and is key to correct interpretation of foetal growth. It is a simple and inexpensive clinical activity, widely used during ANC in both high- and low-income settings worldwide, particularly in low- and middle-income countries including South Africa, where access to ultrasound machines and trained ultra-sonographers is limited. The effectiveness of SFH use is largely dependent on accuracy of measurements and the findings being accurately plotted onto the foetal growth chart to allow for accurate interpretation. An error in measurement, plotting and/or interpretation of SFH can result in inaccurate estimation of gestational age and growth monitoring which then becomes difficult and inaccurate, all of which can result in inappropriate interventions such as premature induction of labour or prolonged pregnancies.

Aims of the study: The aim of the study was to explore and describe midwives' use of SFH measurement to monitor foetal growth in ANC clinics located within the primary health care (PHC) clinics under eThekwini Municipality administration in KwaZulu-Natal.

Research objectives: The objectives of the study were to: explore the current practices of the midwives in the use of SFH management to monitor foetal growth during pregnancy; determine the perspectives of midwives regarding the use of SFH management to monitor foetal growth during pregnancy; explore the challenges if any that were experienced by the midwives in the use of SFH management to monitor foetal growth during pregnancy; and, describe how correct use of SFH measurements to monitor foetal growth during pregnancy can be enhanced.

Method: A qualitative descriptive design using the theory of planned behaviour as a framework to guide the study was employed. Data was collected through semi-

structured interviews with 20 registered midwives working at ANC clinics and a retrospective record review of 60 maternity case records for pregnant women attending ANC. Data from the interviews were thematically analysed following the six steps of qualitative data analysis, and document analysis used content analysis.

Findings: The study findings revealed that in the majority of cases the SFH measurements were done as expected. Nevertheless, situations also prevailed where this was not correctly done, meaning SFH measurements were either incompletely done, incorrectly done or missing. In most cases these were blamed on several challenges experienced by the midwives working in the ANC clinics which included shortage of human and material resources, overcrowded ANC/PNC clinics, time constraints and limited skills. The perceptions of midwives and the culture that prevailed in the ANC clinics influenced how the midwives used the SFH measurement to monitor foetal growth.

Conclusion and recommendations: Evidence of good practices from some participants and record reviews support the researcher's conclusion that although gaps exists in the use of SFH measurements to monitor foetal growths, these gaps could be corrected by addressing all prevailing challenges. A number of these challenges could be overcome with both policy formulation and/or review, particularly with regards to provision of material and human resources; improvement of clinical practice during service delivery, paying particular attention to constructive feedback to staff regarding their performance; and/or aligning the nursing education curriculum more closely to clinical practice.

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GLOSSARY OF TERMS

Advance midwife (ADM) refers to a midwife specialist which is a registered professional nurse and midwife who has advanced expertise in midwifery and is registered as such with South African nursing council. Midwife specialists act as leaders, clinical specialists, consultants, managers, researchers, change agents, advocates and educators in midwifery including neonatal care, and give direction at local, national, regional, and international levels (South African Nursing Council [SANC] 2014).

Antenatal Care (ANC). The World Health Organisation (WHO) (2016: 1) defines ANC as the care provided by skilled healthcare professionals to pregnant women and adolescent girls in order to ensure the best healthcare conditions for both mother and baby during pregnancy, the aims of which are to ensure that pregnancy causes no harm to the mother and to keep the foetus healthy during the antenatal period.

Basic antenatal care approach is a modified version of the focused antenatal care approach that was recommended by researchers during 2001 and adopted by the WHO in 2002 (Ngxongo 2018: 1).

'Ideal Clinic' is defined as a clinic with good infrastructure (i.e. Physical condition and spaces, essential equipment, and information and communication tools), adequate staff, adequate medicines and suppliers, good administrative processes, and adequate bulk suppliers; such as clinic uses applicable clinical policies, protocols and guidelines, as well as partner and stakeholder support, to ensure the provision of quality health services to the community (Hunter *et al*.2017:111).

Foetus is defined as conceptus from the beginning of the ninth week after conception, to term (Sellers 2012:756).

Focused antenatal care (FANC) refers to an approach that was designed and tested by WHO in 2001. FANC came to replace traditional approach. FANC recommended a minimum of four visits for women with uncomplicated pregnancies and emphasised quality of care to improve both maternal and neonatal outcomes.

Gestational age is the age of the embryo or foetus estimated from the first day of the last normal menstrual period.

Intra uterine growth restriction (IUGR) refers to the situation where the fetus does not grow according to its genetic growth potential (Cohen *et al*.2016:821)

Midwife is a licensed person who is registered with the South African Nursing Council (SANC) based on completion of a recognised education and programme to nurture, assist and treat the clients who can be a woman, a neonate or family in the process of promoting a healthy pregnancy, labour and postpartum period, working with the clients according to prescribed professional codes (South African Nursing Council 2001).

Perinatal mortality refers to death around the time of delivery and includes both fetal deaths (at least 20 weeks of gestation) and early infant (neonatal) deaths (MacDorman and Gregory 2015:1).

Primary healthcare (PHC) refers to the first level of care provided to the community. Dookie and Singh (2012: 2) define primary health care as the services provided by general practitioners, nurses or other allied health professionals and is regarded as the first point of entry to the health system.

Symphysis fundal height (SFH) measurement. This is the distance from the symphysis pubis to the top of the uterine fundus. This measurement is routinely used in clinical practise for monitoring of foetal growth during pregnancy to identify foetuses at higher risk of perinatal morbidity and mortality (Whelan *et al.* 2022: 2).

Stillbirth is often defined as death of a fetus which is greater or less than 20 weeks of gestation (Silver 2018:89).

Small for gestational age refers to a newborn with a low birth weight for gestational age, according to the reference curve for normal foetal growth or birth weight for gestational age, defined as either less than the 3rd percentile or less than the 10th percentile, and has been associated with stillbirths and neonatal deaths (Lee *et al.* 2013 cited in Ludvigsson *et al.* 2018: 3).

LIST OF ACRONYMS

Acronym	Full term
ANC	Antenatal care
BANC	Basic antenatal care
EAP	Every new-born action plan
FGR	Foetal growth restriction
FANC	Focused antenatal care
GAP	Growth assessment protocol
IUGR	Intrauterine growth retardation
LGA	Large for gestational age
NDP	National development plan
MOU	Midwifery obstetric unit
MDG	Millennium development goal
PHC	Primary health care
PPIP	Perinatal problem identification programme
TPB	Theory of planned behaviour
SFH	Symphysis fundal height
SGD	Sustainable development goal
SGA	Small for gestational age
SANC	South African Nursing Council
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

OUTLINE OF CHAPTERS

CHAPTER	TITLE	CHAPTER CONTENT
1	**OVERVIEW OF THE STUDY**	Presents the introduction and background, aim, objectives, research questions, problem statement and significance of the study.
2	**LITERATURE REVIEW**	A written synthesis and appraisal of evidence on the use of SFH measurement to monitor foetal growth from national and international perspectives is presented.
3	**THEORETICAL FRAMEWORK**	The theoretical framework that guided the study is presented, including details on how it was used to guide the study.
4	**RESEARCH METHODOLOGY AND DESIGN**	Presents a step-by-step description of the research methodology and design that was used for the study, including strategies to ensure research rigour and ethical considerations.
5	**PRESENTATION OF FINDINGS**	Presents the findings of the study, highlighting themes and the sub-themes that emerged from the interviews, retrospective record review and findings on triangulation of selected data components.
6	**DISCUSSION OF FINDINGS**	Presents a discussion of the findings in relation to peer and non-peer reviewed literature.
7	**SUMMARY OF FINDINGS, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS**	Presents a summary of findings on data analysis and interpretation including conclusions, limitations and recommendations

CHAPTER 1: OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND

In 2015, leaders of 193 nations committed to reaching 169 targets around 17 main goals by the year 2030, one of which was to ensure healthy lives and promote well-being through Sustainable Development Goals (SDGs). These goals integrate a universal agenda that seeks to balance human prosperity with the protection of the planet. The SDG number 3 is to ensure healthy lives and promote well-being for all at all ages, bringing health and wellbeing to the centre of the 2030 agenda. The goal addresses several fronts, some of which include reduction of mortality rates, ending epidemics, increasing disease prevention, ensuring access to sex education, achieving universal health coverage, support vaccine development and improve training of health professionals in developing countries.

One of the SDG 3's targets is to end preventable death of new-borns and children under 5 years of age which includes the reduction of neonatal mortality to as low as 12 per 1 000 live births and under 5 years of age mortality to as low as 25 per 1 000 by 2030 (Froede 2018). Nevertheless, neonatal and stillbirth rate continue to place a significant burden on the health system as well as on pregnant women and their families (Reinebrant *et al.* 2017: 213).

According to Reinebrant *et al.* (2017: 213), nearly three million babies are stillborn every year and these deaths have deep and long-lasting effects on parents, healthcare providers and society. The United Nations Inter-Agency Group for Child Mortality Estimation (2020: 3) concurs, stating that a stillbirth occurs every 16 seconds somewhere in the world, and that losing a life through stillbirth is a loss that reaches far beyond the loss of life, having traumatic long-lasting impact on women and their families around the world, often resulting in profound psychological suffering as well as stigma from their communities, even in high-income countries. Often it is a loss that could have been avoided with high-quality care antenatally and during birth with improved monitoring and access to emergency obstetric care when required. Lawn *et al.* (2016 cited by Reinebrant *et al.* 2017: 213) states that the global stillbirth rate is estimated to be around 2.6 million stillbirths each year which is 18.4 stillbirths per 1 000 births. Willige (2020) further indicated that even though stillbirth rate globally has declined by 35% over the past 20 years, almost 2 million babies are stillborn in the late stages of pregnancy and during birth every year, the majority of which are preventable. This Author further highlighted

that women in developing economies are at most risk, especially in sub-Saharan Africa, which has the highest stillbirth rate in the world. According to the Mama Academy (2021), growth restriction in the foetus is the single largest risk factor for stillbirth, and the risk increases seven-fold if growth restriction is undetected. The UK is one of the countries with the worst stillbirth rates in the developed world with at least 40% of all stillbirths related to foetal growth restriction (Mama Academy 2021).

With regards to neonatal mortality, UNICEF data revealed that in 2017, 2.5 million children died in the first month of life worldwide with approximately 7 000 neonatal deaths every day out of which 2 million occurred between the first day of birth and the sixth day of life (Froede 2018). In 2018, globally, 2.5 million children died in the first month of life which amounted to approximately 7000 newborn dying every day, being 47% of all child deaths under the age of 5 years (Rhoda *et al.* 2018). This Author further revealed that the absolute number of deaths is unacceptable high in the lower-middle income countries such as South Africa(SA). Froede (2018) concurs that the global burden of child deaths is a call for imperative and intensive action to improve the survival chances of the world's children.

There is research evidence that a significant number of neonatal deaths and stillbirths could be prevented if all pregnant women receive good quality antenatal, intrapartum, and postpartum care (Annan and Asiedu 2018; Willige 2020). According to Ciobanu *et al*. (2019: 486.e1), small for gestational age (SGA) neonates are at increased risk for perinatal mortality and morbidity but this risk can be substantially reduced if the condition is identified prenatally, because in such cases close monitoring and appropriate timing of delivery and prompt neonatal care can be undertaken.

Reinebrant *et al.* (2017: 221) recommend improving the care of women during pregnancy, and intrapartum as a priority to reduce stillbirths. This calls for all midwives and Doctors working in obstetric units and antenatal clinics to provide quality antenatal care to all pregnant women. Antenatal care (ANC) is a type of preventive healthcare, the goal of which is to provide regular check-ups that allow doctors and midwives to treat and prevent potential health problems throughout the course of pregnancy and to promote healthy lifestyles that benefit both mother and foetus. The WHO (2016: 1) defines ANC as the care provided by skilled healthcare professionals to pregnant women and adolescent girls in order to ensure the best healthcare conditions for both mother and baby during pregnancy, the aims of which are to ensure that

pregnancy causes no harm to the mother and to keep the foetus healthy during the antenatal period. Ngxongo (2018: 2) reported that globally ANC is advocated as the cornerstone for reducing children's death and improving maternal health. ANC attempts to ensure, by antenatal preparation, the best possible pregnancy outcome for women and their babies which may be achieved by screening for pregnancy problems, assessment of pregnancy risk, treatment of problems that may arise during the antenatal period, giving medications that may improve pregnancy outcome, provision of information to pregnant women, and physical and psychological preparation for childbirth and parenthood (South Africa, Department of Health 2016: 29).

Pay, Wiik and Klovning (2015: 2), highlighted that, abnormal foetal growth is among the most common and complex problems in modern obstetrics. Monitoring the intra-uterine development of the foetus at different stages of pregnancy, even at earlier gestational ages is vital for early detection of growth abnormalities. Monitoring of foetal growth by clinicians is an essential part of care of the pregnant woman with the aim determining if there are growth abnormalities that may signify underlying nutritional disorders or disease, and to take steps to reduce related perinatal morbidity and mortality (Papageorghiou *et al.* 2018: 1). Furthermore Peter *et al.* (2015) concurs that monitoring the baby's growth is important during pregnancy because it is essential to identify poor growth as soon as possible because delay might result in the baby's death.

There are a number of tools that are used to monitor foetal growth, some of which include: the use of customised growth charts, clinical examination/abdominal palpation, abdominal palpation of fundal height in relation to anatomical landmarks such as the umbilicus and xiphisternum, SFH measurement using tape measure, ultrasound scanning and abdominal girth measurement. The methods available for detecting foetal growth in clinical practice include simple technical measurements that are widely accepted, such as abdominal palpation and SFH (Wanyonyi and Mutiso 2018: 29).

1.1.1 Symphysis fundal height (SFH) measurement

Assessment of foetal growth by SFH measurement is one of the aims of antenatal care used as a screening tool of choice for foetal growth monitoring to identify small and large for gestational age foetuses at increased risk of perinatal morbidity and mortality. It is a simple and inexpensive clinical activity, widely used during antenatal care in both high- and low-income settings worldwide, particularly in low and middle income countries where access to ultrasound machines and trained ultra sonographers is limited (Papageorghiou *et al.* 2016: 1). The simplest way to determine growth is to examine the baby by palpating the mother's abdomen and estimating the size of her womb compared with a landmark such as the navel (umbilicus). An alternative method is to use a tape measure to take a measurement, known as the SFH measurement, from the mother's pubic bone (symphysis pubis) to the top of the womb.

The technique of SFH measurement was first described by Spiegelberg in the German literature in 1891 and was originally meant to detect the growth-restricted fetus rather than to estimate the gestational age (Lehrbuch der geburtshulfe furarzte und studierende 3:126, aufl. Neu bearbeitet von Max Wiener, Lahr, 1891 cited in Mongelli 2018). SFH is a widely used method of monitoring foetal growth surveillance for low risk pregnancies. It is an important first level screening tool during routine antenatal care. The cost effectiveness and non-invasive nature makes it a useful primary screening tool. Papageorghiou *et al.* (2016: 1) attest that the SFH is beneficial in low risk pregnancies where serial measurement of SFH is recommended as a simple and inexpensive first level screening tool.

The SFH is measured using a centimetre tape measure and it is expected that 1 cm is equivalent to 1 week of gestation. There are differing opinions regarding the appropriate gestation during which to commence measuring of SFH. According to the WHO (2016), the SFH measured in centimetres should correspond to the weeks of gestation for a normally growing foetus from 24 weeks of gestation up until 36 weeks of gestation, with an allowance of a 2 cm difference (WHO 2016). Recommendations from the Perinatal Institute are that measurements are commenced between 26-28 weeks' gestation (Mama Academy 2021). According to the Department of Health (2016: 31), SFH measurement is of little value for estimation of gestational age at less than 20 centimetres, and equal to or more than 35 centimetres (corresponding to less than 20 weeks and term respectively) and therefore

recommends that it should be used for estimation of gestational age after 24 weeks in the presence of a normal singleton pregnancy up to 36 weeks gestation.

The aim of SFH measurement is to ascertain whether the foetus is growing as expected and to exclude abnormal foetal growth which could be either excessive or restricted as detected through abnormal SFH measurements.

The Department of Health prescribed the compulsory use of SFH measurements to monitor foetal growth at all levels of maternity care in the manual for clinics, community health centres and district hospitals (Guidelines for Maternity Care in South Africa) (South Africa, Department of Health 2016: 31). At every ANC visit SFH measurement should be done as part of the routine examination of the pregnant women by measuring the distance in centimetres from the highest point of the fundus of the uterus to the superior border of the symphysis pubis. The findings are then plotted on a graph (growth chart) against the gestational age and compared with the 10th, 50th and 90th centiles for gestational age and with previous measurements (South Africa, Department of Health 2016: 33). A woman is considered to have a small-for-gestational age foetus if a single SFH plots below the 10th centile or serial measurements demonstrate slow or static growth and a large for gestational age foetus if the SFH plots above the 90th centile (Wanyonyi and Mutiso 2018: 32).

A foetal growth chart is a vital tool for assessing foetal risks during pregnancy (Anggraini, Abdollahian and Marion 2020: 1). Although at least 21 different locally derived SFH charts are currently being used in clinical practice worldwide, the authors developed the new international SFH standards which they recommend should be used in combination with standardised measurement methodology to unify and improve clinical practice. Plotting measurements in the medical records with these tools should be undertaken to identify women who require referral for an ultrasound scan (Papageorghiou *et al.* 2016: 5). O'Gorman and Salomon (2018:7) point out that there are many published foetal growth charts available but emphasize that the choice of chart used requires careful consideration.

The impact of utilising growth charts in clinical practise has been investigated in Indonesia where the results showed a significant improvement in detection of abnormal growth and remarkable reduction in unnecessary referrals (Anggraini, Abdollahian and Marion 2020: 1). O'Gorman and Salomon (2018: 7) acknowledge the importance of the introduction of foetal

growth charts into routine ANC on the basis that foetal size and growth trajectories are relevant indicating factors of foetal health, because they have associated sequelae extending into adult life.

It is critical that measurement is done accurately and the findings plotted accurately onto the graph to allow accurate interpretation. Correct estimation of gestational age remains an integral component of quality prenatal care because it allows for proper scheduling of prenatal care, informs decision-making at different stages of pregnancy, and is key to the correct interpretation of foetal growth parameters (Wanyonyi and Mutiso 2018). According to Wanyonyi and Mutiso (2018) in the absence of reliable estimation of gestation age, appropriately growing foetuses can be erroneously labelled as small or large for gestational age or growth-restricted pregnancies allowed to progress. Furthermore, Wanyonyi and Mutiso (2018) state that an error in measurement, plotting and or interpretation can result in inaccurate estimation of gestational age and subsequent growth monitoring becomes difficult and inaccurate, all of which may result in inappropriate interventions such as premature induction of labour or prolonged pregnancies

The challenge with SFH measurement is that it is subject to significant intra- and inter-observer variation and can be distorted by other factors such as a full bladder and morbid obesity (Peter *et al*. 2015). This makes the skill of the health provider who is measuring, recording and interpreting, very important. Thus, the intention of the researcher in the proposed study was to explore and describe the use of SFH measurement by the midwives from selected ANC clinics in eThekwini district KwaZulu-Natal (KZN) to monitor foetal growth.

1.2 PROBLEM STATEMENT

The researcher, who is a practicing midwife in one of the ANC clinics in eThekwini District, has witnessed a number of occasions where the growth chart contained in the maternity case record of pregnant women was not accurately completed as prescribed by the Department of Health Maternity Care Guidelines and the Basic ANC handbook (South Africa, Department of Health 2016). Every ANC visit should include SFH measurement plotted onto the 50th percentile line on the SFH graph. This should be done to allow for estimation of gestational age after 24 weeks in the presence of a normal singleton. The measurement of SFH also allows the corresponding gestational age to be read and interpreted from the graph by attending midwives and practitioners (South Africa, Department of Health 2016; United States Agency for International

Development [USAID] 2004). The effectiveness of SFH use is largely dependent on accuracy of measurements with findings accurately plotted onto the graph in the foetal growth chart to allow accurate interpretation (Anggraini, Abdollahian and Marion 2020). Therefore, failure of midwives to accurately measure and plot SFH onto the graph poses a risk of inaccurate interpretation and possible misdiagnosis of deviation of foetal growth from normal. Nkwanyana *et al.* (2019) state that in low resource settings, 66.7%, 11.9% and 7.1% of preventable intrapartum-related deaths are related to substandard care by a health workers, administrative factors, and referral factors, respectively.

In addition, the researcher has also observed that a number of stillbirths and neonatal deaths discussed in the district perinatal meetings were due to growth restriction that was missed during ANC. The following statistics related to perinatal deaths (stillbirths plus early neonatal deaths) as reported in the eThekwini District Health Plan 2015-2016 (KwaZulu-Natal Department of Health 2015):

- Perinatal mortality in eThekwini district ranged between 7.2 and 9.4 per 1000 live births
- A total of 510 to 637 early neonatal deaths out of a total of 53 073 to 58 446 live births annually, thus giving a ratio of 8.7 to 12.0 early neonatal deaths for every 1 000 live births during this period.

Mama Academy (2021) reports that growth restriction of the foetus is the single largest risk factor for stillbirth, and the risk increases seven-fold if growth restriction is undetected, and Ciobanu *et al.* (2019) states that small-for-gestational-age (SGA) neonates are at increased risk for perinatal mortality and morbidity. Both authors concur that these risks can be substantially reduced if the condition of growth restriction is identified prenatally, because in such cases close monitoring and appropriate timing of delivery and prompt neonatal care can be undertaken. Although several studies have explored intra-uterine growth retardation as one of the major contributory causes of still births and early neonatal deaths (Wanyonyi and Mutiso 2018; Mongelli 2018; Pay, Wiik and Klovning 2015), none of these studies explored the practices and perceptions of the midwives regarding the use of SFH measurements to monitor foetal growth. Thus, this study aimed to explore and describe the midwives' use of SFH measurement to monitor foetal growth.

1.3 AIMS OF THE STUDY

The aim of the study was to explore and describe midwives' use of SFH measurement to monitor foetal growth in ANC clinics located within the PHC clinics under eThekwini Municipality administration in KZN.

1.4 RESEARCH OBJECTIVES

The objectives of the study were to:

- Explore the current practices of midwives in the use SFH management to monitor foetal growth during pregnancy in eThekwini District.
- Determine the perspectives of midwives towards the use of SFH management to monitor foetal growth during pregnancy in eThekwini District.
- Explore the challenges if any that are experienced by midwives in the use of SFH management to monitor foetal growth during pregnancy in eThekwini District.
- Describe how correct use of SFH measurements to monitor foetal growth during pregnancy can be enhanced in eThekwini District.

1.5 RESEARCH QUESTIONS

The study aims to answer the following research questions:

- What are the current practices of midwives in eThekwini District regarding the use of SFH measurements to monitor foetal growth?
- What are the perspectives of midwives in eThekwini District towards the use of SFH measurement to monitor foetal growth?
- What challenges, if any, are experienced by the midwives eThekwini District with the use of SFH measurement to monitor foetal growth?
- How can the correct use of SFH measurement to monitor foetal growth during pregnancy be enhanced in eThekwini District?

1.6 SIGNIFICANCE OF THE STUDY

The study was a way for the researcher to confirm the anecdotal evidence that she had observed (gaps in the practices of midwives in the using SFH measurements to monitor foetal growth) so that she could present this as scientific evidence.

Exploration of the current practices of the midwives in the use of SFH measurement to monitor foetal growth will assist in the identification of both gaps and good practices, if any, which the researcher can use to make recommendations for improved practice in this regard.

The findings and recommendations from the study, if acknowledged and implemented, can be used as follows:

- Policy makers can review current policies and/or formulate new policies related to the practice of midwives in the care of pregnant women at ANC level.
- The challenges faced by midwives will be acknowledged and can therefore be addressed.
- Pregnant women will benefit in that should the practice of midwives in the use of SFH improve, foetal growth deviation from normal will be identified and thus appropriately and timeously managed with a possibility of improved pregnancy outcomes.

Although the planned study is a qualitative study that is not generalisable, the findings from the current study could benefit other ANC clinics within and outside eThekwini District who are in a similar situation as the clinics under study, and could form the baseline for a broader study on foetal growth monitoring.

1.7 RESEARCH METHOD

The study employed a qualitative descriptive design using the theory of planned behaviour (TPB) by Icek Azjen as a theoretical framework to guide the study. Data was collected from practicing midwives registered with the South African Nursing Council (SANC), working in the PHC clinics under the eThekwini Municipality administration in eThekwini District involved in ANC services provision. Semi-structured interviews conducted by the researcher in English and guided by an interview guide were used to collect data. In addition, data was collected using a retrospective record review of maternity case records for pregnant women who were attending ANC at the time of the study. All data gathered was thematically analysed following the six steps of qualitative data analysis as described by Creswell (2014). A report from the findings on data analysis has been compiled and supported with relevant peer and non-peer reviewed literature to allow the researcher to draw conclusions and make recommendations from the study.

1.8 CHAPTER SUMMARY

Chapter 1 presented an overview to the study. The problem statement, significance, aims and objectives of the study were presented. The next chapter focuses on a literature review and will also present a theoretical framework that will be used to guide the study.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 3 presents the literature review. A literature review is a written synthesis and appraisal of evidence on a research problem which researchers undertake as an early step in conducting a study (Polit and Beck 2021: 82; McCombes 2021). According to Polit and Beck (2021: 83), a literature review provides the readers with an overview of existing evidence and contributes to the argument for new research. In this chapter, a written synthesis and appraisal of evidence on the use of SFH measurement to monitor foetal growth from national and international perspectives is presented, thus providing a foundation for the planned research project which aims to explore and describe the experiences of midwives regarding the use of SFH measurement to monitor foetal growth in selected ANC clinics in the eThekwini district.

2.2 STRATEGIES USED TO SEARCH LITERATURE

The literature search commenced within the Durban University of Technology's (DUT's) library where with the aid of the librarian. Hard copies of books on the shelf and soft copies of items in the institutional repository were accessed which however did not yield much on the proposed title. This was followed by searching databases for local and international input through various search engines including EBSCO Host search engine focusing on nursing journals, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medical literature on-line (MEDLINE), Pub-med Public/Publisher Medline database, Google Scholar and MOODLE to name just a few. In addition, the inter-library loan system was also used which allowed the researcher to get more hard and soft copies of relevant literature from neighbouring higher education institutions. The latter enabled the researcher to obtain documentary and electronic information, and data only available from other academic institutions and organisations to which the DUT library is affiliated. The archives, databases, and websites of local and international institutions and organisations such as the WHO, the SANC, and the South African Department of Health were consulted in in order to obtain a multi-perspective approach to the research topic.

The focus of the literature search was international, national, and local perspectives on foetal growth monitoring during pregnancy, strategies used to monitor foetal growth, why it is

important, benefits and challenges of foetal growth monitoring, and successes and challenges of using SFH measurements. A set of keywords was decided upon before engaging in the search. Identifying keywords for the subject before initiating any literature search ensured that correct results were obtained. The key phrases that were used as search terms included: ANC, foetal growth, growth restriction, foetal growth assessment, foetal growth measurement (FGM), FGM and recording, midwives' role in FGM, diagnosis of foetal growth restriction (FGR), foetal growth monitoring, SFH. Each search term was initially used individually, and then combined using Boolean operators AND, OR and NOT which are widely used to expand or delimit a search (Pilot and Beck 2018: 99).

2.3 THE BURDEN OF PERINATAL MORTALITY ON HEALTH SYSTEMS

One of the Sustainable Development Goals (SDG) targets is to end preventable death of new-borns and children under 5 years of age which includes the reduction of neonatal mortality to as low as 12 per 1 000 live births, and under five-year old mortality to as low as 25 per 1 000 by 2030 (United Nations 2020). Neonatal and stillbirth rate place a significant burden on health system as well as on pregnant women and their families (Reinebrant *et al.* 2017). This is evidenced by several authors reporting an increased burden of stillbirth from the past years till today (Reinebrant *et al.* 2017; WHO 2017; Noge 2018). According to Reinebrant *et al*. (2017), nearly 3 million babies are stillborn every year and these deaths have deep and long-lasting effects on parents, healthcare providers and the society. Willige (2020) states that while the stillbirth rate globally has declined by 35% over the past 20 years, almost 2 million babies are stillborn in the late stages of pregnancy and during birth every year, the majority of which are preventable. According to the Mama Academy (2021), growth restriction in the foetus is the single largest risk factor for stillbirth, and the risk increases seven-fold if growth restriction is undetected.

According to Pay, Wiik and Klovning (2015), abnormal foetal growth is among the most common and complex problems in modern obstetrics. The conditions related to abnormal foetal growth include intra uterine growth retardation, micro/macrosomia, hydrops foetalis, anencephaly and hydrocephalus (WHO 2017). It is essential that poor or deviation in foetal growth is identified as soon as possible because delay might result in the baby's death (Peter *et al.* 2015). This makes monitoring the intra-uterine development of the foetus at different stages of pregnancy, even at earlier gestational ages, vital for early detection of growth abnormalities. Clinicians

should monitor foetal growth as an essential part of care of the pregnant woman with the aim of determining if there are growth abnormalities that may signify underlying nutritional disorders or disease, and if need be taking steps to reduce related perinatal morbidity and mortality (Papageorghiou *et al.* 2018).

2.4 INCREASED BURDEN OF STILLBIRTH

2.4.1 Global perspective regarding stillbirth rates

Although several authors have reported an increased burden of stillbirth from the past years until today, the WHO (2021) reported that worldwide, the number of stillbirths has declined by 19.4% between 2000 and 2015, which is a reduction rate of only 2%. Laws *et al.* (2016, cited in Reinebrant *et al*. 2017: 213) reported that globally stillbirth rates were estimated to be around 2.6 million stillbirths each year which is 18.4 million per 1 000 births. UNICEF's data reported that in 2017, 2.5 million children died in the first month of life worldwide, with approximately 7 000 neonatal deaths every day, of which 2 million occurred between the first day of birth and sixth day of life. The global tragedy of stillbirths was on a downward trend prior to the outbreak of COVID 19 but numbers were still enormous, with 1.9 million being stillborn in 2019, which is one stillbirth every 16 seconds. The UK is one of the countries with the worst stillbirth rate in the developed world with at least 40% of stillbirths related to intra-uterine growth restriction (IUGR) (Mama Academy 2021). Countries with the highest stillbirth rates are all in sub-Saharan Africa or south Asia such as Pakistan, Central African Republic, South Sudan, and Afghanistan. Hug *et al*. 2019: e710 indicated that between 2018 and 2030, they project that 27.8 million children will die in their first month of life if each country maintains its current rate of reduction in neonatal mortality rate (NMR). Furthermore, Haran and Everett 2017:44 indicated that there is an increasing awareness that many stillbirths can be prevented through early detection and appropriate monitoring when risk factors become evident. Mama Academy (2021) revealed that growth restriction is the major risk for stillbirth and this risk increases sevenfold if growth restriction is not detected.

2.4.2 The African perspective regarding stillbirth rates

East African countries account for one-third of the 2.6 million stillbirths globally (Tesema *et al*. 2021: 1). The rate of stillbirths in developing countries is estimated to be four to ten times compared to the developed nations, however the incidence rates are the highest in sub-Saharan Africa (Smith and Fretts 2006, cited in Badimsuguru *et al*. 2016: 2).Many middle income countries(LMIC) have stillbirth rates above 30 per 1000 live births which is three times higher than in high-income countries (Aminu, Mathai and Van den Broek 2019:2) The Democratic Republic of Congo has one of the highest perinatal mortality rates in the world with > 40 per 1 000 live births; maternal, neonatal and child health services are rarely used and are of poor quality (Ntambue *et al.* 2013 cited in Ntambue *et al.* 2016:Therefore this is a call for each and every midwife in African country to work very hard to provide quality antenatal care in order to reduce stillbirths and to meet SDG 3 by 2030.

2.4.3 South African perspective regarding stillbirth rates

Statistics South Africa (2017) shows that perinatal deaths in South Africa are characterised by higher stillbirths compared to early neonatal deaths. Furthermore, Rhoda *et al.* (2018: s15) reported that South Africa has a double burden of disease that leads to neonatal mortality, with term babies dying from intrapartum-related problems. Haran and Everett (2017: 44) reported that there is an increasing awareness that many stillbirths can be prevented if early detection and appropriate monitoring is done. The number of stillbirths and neonatal deaths differs from province to province in South Africa. According to Statistics South Africa (2018) there were 36.4 infants' deaths per 1000 live births in 2018. KwaZulu-Natal province in South Africa has the largest population of children under the age of five and experiences the highest number of child births per annum in the country (McGee *et al.*2016:1).Furthermore Noge (2018) conducted a study in Free state found that stillbirths are also caused by lack of empowerment, social norms, abuse by partner, beliefs, and practices such to poor attendance at clinics and women failing to seek medical assistance.

STRATEGIES USED TO PREVENT STILLBIRTHS

2.4.4 The global perspective

World health organisation (WHO) reviewed current knowledge on birthweight as a health outcome in 2002 and identified a need for research to develop fetal growth charts for international use (Aboderin *et al*. 2002 cited by Kiserud *et al*. 2017:4). Foetal growth charts are now used globally by midwives and doctors in all health care facilities in maternity departments in order to monitor the growth of foetus while in utero. However foetal growth chart was not introduced in primary health care facilities in Indonesia until Anggraini, Abdollahian and Marion (2020) conducted a study that clearly identified the need to develop foetal growth charts to be used in primary health care settings in that country.

Furthermore, Lawes and Jones (2021:1) indicate that Perinatal Institute in the United Kingdom developed a growth assessment protocol (GAP) using a standardising clinical practice on measuring symphysis fundal height(SFH) to accurately plot foetal growth on a customised chart and refer if IUGR is detected. Measuring SFH is practised by midwives globally as a technique to assess foetal growth during pregnancy. This is a crucial technique that allows midwives to identify IUGR and large for gestational age (LGA) with the aim of reducing neonatal mortality and morbidity. Nove *et al*. (2020: e24) confirmed that strengthening the capacity of midwives to deliver high quality maternal and new-born health services has been highlighted as a priority by global health organisations. Furthermore, a study conducted by Lawes and Jones (2021) revealed that GAP has made a great effort in upgrading midwives' skills regarding SFH measurement and the accurate plotting of foetal growth charts.

Worldwide, the total number of neonatal deaths decreased from 4.7 million in 1990 from 4,7 million in 1990 to 2.8 million in 2013 neonatal rate per 1000 live births declined from 33 to 20 over the same period, a reduction of 39% (WHO STAT:2015:15). The need to reduce stillbirth in low and middle-income countries was acknowledged in 2014 when 194 member states of the 67th world health assembly led by WHO and UNICEF developed Every New-Born Action Plan (ENAP), the aim of which was to provide a road map of strategic actions for ending preventable new-born mortality and stillbirth by 2030.In an effort to accelerate progress toward the SDG targets and goals, ending preventable maternal mortality (EPMM) has established coverage targets and milestones to track progress to 2030. These coverage targets and

milestones were developed in consultation with relevant stakeholders and partners at national, regional and global level, and also ensured alignment with the targets and milestones launched by Every Newborn Action Plan (ENAP) in September 2020, (WHO,2020).

Another strategy was presented by Lawes and Jones (2020). The authors in this study recommended a GAP training for student midwives as a strategy that can assist in improving the skill of midwives which will ultimately improve monitoring and management of pregnant women. According to the authors such a training programme has the potential to provide a sustainable workforce, prepared according to the WHO's global strategy to eliminate avoidable stillbirths by 2030. Lawes and Jones (2020) also concluded that teaching GAP to all student midwives at undergraduate level could equip them in clinical reasoning and skill acquisition to respond to complex clinical environments.

2.4.5 Strategies used to reduce stillbirths in African countries

National countries such as Ghana, Kenya and Congo have used a variety of approaches to reduce high mortality and morbidity rates. Back in the 1900s a traditional ANC service model was in use until replaced by the focused antenatal care (FANC) approach. The Government of Ghana adopted the WHO FANC approach in 2002 in an attempt to address the comparatively high maternal mortality rate and to improve access, quality, and continuity of antenatal care for pregnant women (Baffour-Awuah, Nyaledzigbor and Richter 2015:59). FANC successful implementation comes with several benefts to the community, such as the steady improvement in maternal mortality and reduced child mortalities as a result of increased utilization of FANC (Haruna, Dandeebo and Galaa 2019:9). Gitonga (2017:1) further indicated that Focused antenatal care is one of the interventions to reduce maternal morbidity and mortality. Midwives in Ghana were satisfied with FANC as the quality of care for pregnant women and unborn children improved pregnancy outcomes (Birungi *et al.,* 2006 cited in Baffour-Awuah, Nyaledzigbor and Richter 2015: 60). A slow decrease in neonatal mortality over the years as compared to under 5-year-old mortality has been a cause for global concern. This resulted in the Ghana Ministry of Health and development partners to develop a National New-Born Health Strategy to accelerate the reduction of new-born deaths in Ghana (Ghana Newborn Strategy and Action Plan 2014-2018:11). It has been found that there are some challenges faced by pregnant mothers which lead to poor antenatal care attendance in Ghana. These include socio economic inequalities and level of education and are a major barrier to achieve SDG 3 in

Ghana. Dalinjong, Wang and Homer (2018: 1) reported that a free maternal health policy was implemented in Ghana in 2008 under the National Health Insurance (NHI) scheme to eliminate out-of-pocket payment and enhance utilisation of maternal health services. Evidence shows that regardless of socio-economic and demographic factors, women enrolled in NHI scheme make more antenatal visits compared to those who are not enrolled (Dixon *et al.* 2014). As for level of education, the Ghana Multiple Indicator Cluster survey (2011) conducted in 2011 revealed that 78% of women without education received ANC for four or more times compared to 97% of women with higher or secondary education. This means that Ghana still needs to emphasise the importance of health education to pregnant women. Gitonga (2017) further reported that the Kenyan government at national and county level has put measures to improve maternal health. This includes setting up health facilities to offer perinatal care, training of staff, and provision of supplies. Policy guidelines have also been put in place for managerial and operational level.

Researchers have also looked at the Democratic Republic of Congo (DRC). Brogen *et al*. 2020: para 1line1) indicated that in this country, maternal and neonatal health outcomes are poor and delivering healthcare services of sufficient quality is a challenge as there are 0.6 midwives, physicians, or nurses for every 1 000 inhabitants. Nationally in DRC, several methods are used in clinical practice in order to monitor foetal growth during pregnancy and to reduce neonatal mortality, including:

- The use of customised growth charts
- Clinical examination/abdominal palpation
- Abdominal palpation of fundal height in relation to anatomical landmarks such as the umbilicus and xiphisternum
- SFH measurement using tape measurement
- Ultrasound scanning
- Abdominal girth measurement.

Even though these methods are in use in clinical settings, ultrasound remains the most reliable and objective way to monitor foetal growth (Wanyonyi and Mutiso 2018: 29).

2.4.6 Strategies in the South Africa context

Prenatal care, also known as antenatal care (ANC), is a type of preventive healthcare with the goal of providing regular check-ups that allow doctors and midwives to treat and prevent potential health problems throughout the course of the pregnancy and to promote a healthy lifestyle that benefits both mother and child. During check-ups pregnant women receive medical information regarding maternal physiological changes and prenatal nutrition including prenatal vitamins. The WHO (2016: 1) defines ANC as the care provided by skilled healthcare professionals to pregnant women and adolescent girls in order to ensure the best healthcare conditions for both mother and baby during pregnancy, the aims of which are to ensure that pregnancy causes no harm to the mother and to keep the foetus healthy during the antenatal period. Ngxongo (2018: 2) reports that antenatal care is advocated globally as the cornerstone for reducing children's death and improving maternal health.

Pregnancy related deaths and diseases remain unacceptably high; in 2015 an estimated 303 000 women died from pregnancy related causes, 2.7 million babies died during the first 28 days of life and 2.6 million babies were stillborn (WHO, 2016). The high number of maternal mortalities in some areas in the world reflect the inequalities in access to health services and there is a gap between rich and the poor. Skilled care during pregnancy and after childbirth can save the lives of women and new-born babies. Women die because of complications during and following pregnancy and most are preventable and treatable. The major complications that account for nearly 75% of all maternal deaths are: severe bleeding, and high blood pressure during pregnancy (pre-eclampsia) (WHO 2018). Sandall et al. (2016 cited by Nove *et al.* 2021: e25) stated that, in high-income settings, midwife led continuity of care has been associated with positive outcomes, including fewer preterm births, fewer fetal losses at any gestation, and high rates of positive experiences reported women.

For provision of antenatal care, traditional approaches to ANC services-were in use until 2007. This model was introduced in 1900s and was used to classify pregnant women according to low and high-risk groups by identifying obstetric complications. Antenatal clients used to attend clinics until 42 weeks gestation. FANC approach was designed and tested by World health organisation in 2001. Focused antenatal care came to replace the traditional approach to ANC services provision. Focused antenatal care (FANC) recommends that all health pregnant women should have a minimum of four scheduled comprehensive antenatal visits during

pregnancy (Gitonga 2017:1) FANC is goal-oriented antenatal care, as recommended by researchers in 2001 and adopted by the WHO in 2002. In 2007 the Department of Health introduced Basic Antenatal Care (BANC), which was adopted in 2008. BANC is used in public health institutions in South Africa to provide health care services to pregnant women. BANC is a modified version of FANC (Ngxongo 2018: 2).

According to the Department of Health, the BANC approach was introduced as a quality improvement based on the belief that good quality antenatal care should reduce maternal and perinatal mortalities to improve MDG 4 and 5. The BANC approach was further improved to BANC+ in 2015. The BANC+ was introduced following a recommendation by Hofmeyr and Mentrop (2015: 3) that for a middle-income country such as South Africa, a reasonable compromise would be to continue to implement the WHO BANC model with reduced, goal-orientated visits up to 32 weeks gestation and thereafter every 2 weeks until 38 weeks, followed by weekly checks till delivery. Thus, BANC+ recommends an early antenatal booking before 14 weeks, then at 20, 26, 30, 34, 36, 38, and 40 weeks gestation, with a hospital visit date at 41 weeks gestation for induction of labour. This is not applicable for women with risk factors or who develop a risk factor during pregnancy, whose return visits schedules will depend on their specific problems (WHO 2016: 33).

The perinatal problem identification programme (PPIP) is another strategy that is being used to minimise perinatal mortality. The PPIP record was developed in the late 1990s and implemented as a strategy to improve perinatal care. PPIP is an audit tool that is used in all maternity departments to analyse perinatal deaths and identify possible cause of death (Rhoda, Greenfield and Muller *et al*. 2014 cited in Noge 2018: xxiii). Furthermore, every new-born action plan (ENAP) has been developed to end preventable deaths and set a stillbirth target of 12 per 1 000 live births or less by 2030 (WHO 2021). According to the Department of Health maternity guidelines (2016: 10) maternal health care has been identified as a priority area requiring urgent action in South Africa. Moreover the African National Congress and South African Government adopted the National Development Plan (NDP) in 2012/2013. The NDP is broadly aligned with the SDGs, and as such might seem promising in addressing the social determinants of health (Scott et al 2017:82). This is in line with the target to achieve the SDGs as well as the target set in our NDP. Furthermore, the Department of Health implemented the strategic plan 2020-2025 in 2020 which is aimed at reducing mortality and morbidity and focuses on improving our

understanding of deaths from different levels of care in order to further reduce under 5 year old and maternal deaths. Based on the strategies identifies, its shows that South Africa is striving to reduce neonatal and maternal morbidity as per targets sets by the Government. The Department of health also encourages booking of pregnant women for antenatal care at the facility levels as to achieve the best neonatal and maternal outcome.

2.5 FOETAL GROWTH MONITORING AS A STRATEGY TO CURB PERINAL MOTALITY

2.5.1 Importance of foetal growth monitoring

Authors have mentioned that perinatal mortality rate is still a challenge in South Africa. Obstetrics and gynaecology departments from all health facilities need to work very hard in terms of monitoring foetal growth in order to minimise the risk of stillbirths in our country. One of the aims of ANC is to monitor the wellbeing of the foetus in utero; problems that may lead to inaccurate foetal monitoring are late booking, inconsistent clinic attendance and change of staff (Sellers 2012). According to BANC+, pregnant mothers must have at least eight antenatal visits before delivery in order to monitor foetal growth at each visit. This is recommended by the Department of Health. The prenatal period of growth and development represents a very delicate phase of life exposed to numerous possible negative effects such as IUGR. Normally, foetal growth is expected to be rapid in the first and second trimester and slows towards the third semester (Feng *et al.* 2020).

SFH measurement at each ANC appointment and plotting of findings on a customised chart is one of the most useful tools used for monitoring of foetal growth during pregnancy, particular in primary health care (PHC) and other midwife running maternity care units. Whelan *et al* (2022:1) indicated that in low- and middle-income countries (LMIC), measurement of symphysis fundal height.

(SFH) is often the only available method of estimating gestational age (GA) in pregnancy. Furthermore, Agarwal and Malik 2017: 22) also stated that abnormal foetal growth can be detected clinically by assessment of SFH measurement and radiological by ultrasound biometry.

2.5.2 Variations in foetal growth

Growth of the foetus is the period from the beginning of the 9th week after fertilisation to the 38thweek of gestation (Sellers 2012: 75). Foetal growth is dependent on the availability of nutrients which is determined by the placenta. One of the most common complications during pregnancy is insufficient growth of the foetus, a problem termed intrauterine growth restriction (IUGR) that is most frequently rooted in a malfunctional placenta (Woods, Perez-Garcia and Hemberger 2018:1) However, there is research evidence that other factors can influence foetal growth. The growth of the foetus can be normal or abnormal. Foetal growth is considered

normal when the weight is either appropriate for gestational age or the deviation to SGA or LGA is as a result of genetic influence with no underlying maternal, foetal and or placental pathologies (Suhag and Berghella 2013). Abnormal foetal growth is when growth deviates from the normal parameters as a result of some risk factors. The most common risk factors responsible for abnormal foetal growth are:

- Maternal causes such hypertension, diabetes, cardiopulmonary disease, anaemia, malnutrition, smoking and drug us;
- Foetal causes such as genetic disease including aneuploidy, congenital malformations, foetal infection and multiple pregnancies; and
- Placental causes such as placental insufficiency, placental infarction and placental mosaicism (Suhag and Berghella 2013).

2.5.2.1 Intra Uterine Growth restriction (IUGR)

Several definitions of IUGR are available in literature. Moh *et al.* (2012) define IUGR as a foetus which is at or below the 10th percentile in weight for its gestational age or an absolute birth weight of less than 2 500g.This is called small for gestational age(SGA).IUGR also refers to an impoverished foetal growth with foetal, maternal, or placental causes (i.e., congenital or chromosomal anomalies, infections, and vascular disorders) of a detrimental cascade in which oxygen reduction (up to hypoxemia) and nutritional deficiencies lead to cardiovascular deterioration, extreme blood flow resistance, and decreased foetal growth rate (Miller,Huppi and Mallard cited by Sacchi *et al.* 2022). In an SGA infant there is a pathological process present that prevents expression of normal growth potential, causing a decrease in foetal

growth rate in IUGR. Reduced foetal growth and subsequent pathological IUGR can be caused by maternal factors such as under nutrition, hypertension, pre-eclampsia, chromosomal abnormalities, multiple foetuses or placental factors (Sharma, Shastri and Sharma 2016 cited by Malhotra *et al.* 2019: 20). Moh *et al*. (2012) concur that the causes of intrauterine growth restriction (IUGR) are multifactorial with both intrinsic and extrinsic influences and further state that infants with IUGR can exhibit early symmetric or late asymmetric growth abnormality patterns depending on the foetal stage of development, of which the latter most commonly occur in 70% to 80% of growth-restricted infants. Often, deformation is the consequence of extrinsic biomechanical factors interfering with normal growth, functioning, or positioning of the foetus in utero, typically arising during late gestation. Thus, Moh *et al*. (2012) advise that while many studies focus on the intrinsic pathological causes, the possible long-term consequences resulting from extrinsic intrauterine physiological constraints merit additional consideration and further investigation.

IUGR is the most challenging issue seen in about 10% of pregnancies, and is associated with approximately 75% of all stillbirths, neonatal deaths, perinatal morbidity, cerebral palsy, and pathological conditions such as obesity, hypertension, and diabetes infants (Agarwal and Malik 2017). According to Moh *et al.* (2012), major uterine constraining factors to IUGR include primigravida, small maternal size, uterine malformation, uterine fibromata, and early pelvic engagement of the foetal head, aberrant foetal position, oligohydramnios, and multifoetal gestation.

There is research evidence that FGR is linked to adverse short- and long-term outcomes including neonatal complications and is a major contributing cause to perinatal mortality. The neonatal complications include haematological and metabolic problems, impaired thermoregulation, intraventricular haemorrhage, necrotising enterocolitis, seizures, sepsis, respiratory distress syndrome, etc., all of which cause an increased risk of neonatal death and contribute to perinatal morbidity. Studies have also shown that together with the profound perinatal impact of FGR, consequences may continue into adult life in the form of metabolic disease as a result of prenatal reprogramming and postnatal compensatory catch-up growth. Andreasen *et al*. (2020: 894) found that being screened by an experienced midwife during early pregnancy and having access to multiple consultations may improve future prognosis of IUGR. The Maternity Guidelines (South Africa, Department of Heath 2016) indicate that diagnosis of

FGR can be ultrasound scanning, including doppler flow studies. If ultrasound is not available, clinical assessment must be used and the mother must be referred to a specialist health facility.

Accurate diagnosis of growth restriction, beyond foetal size alone, is enhanced by integration of other indicators of foetal and placental health. Commonly used clinical tools include antenatal testing for foetal health and for placental function. Various criteria based on percentiles or standard deviations, including weight, length, and head circumference, have been developed to define IUGR foetuses, although many standards used are population-specific, and normal growth charts may have to be redefined (Moh *et al.* 2012).

2.5.2.2 Foetal macrosomia

Foetal macrosomia is defined as a birth weight of > 4 000g which may affect 12% of new-borns of normal women and 15% to 45% of new-borns of women with gestational diabetes mellitus (Kamana, Shakya and Zhang 2015:14). Foetal microsomia results from Large for gestational age babies. Large for gestational age (LGA) describes a neonate who, at birth, weighs at or above the 90th percentile for gestational age (Hong and Lee 2021:124). LGA is a risk factor for perinatal death, birth injury and adverse neonatal outcomes. Such risk can be reduced by elective caesarean section or early induction of labour to limit inevitable increase in foetal size with advancing gestational age (Khan *et al.* 2019: 327)**.** Sellers (2012) revealed that that there is fivefold increased risk of mortality for LGA infants. The most common cause of LGA is macrosomia associated with diabetes. Other causes may include obesity in the mother, erythroblastosis foetalis, and family trends. If the mother is a known diabetic on treatment, the midwife should anticipate the potential problems of the new-born, including macrosomia. Glodean,Miclea and Popa (2018:18) indicated that, considering the maternal, foetal and neonatal complications of macrosomia, the counselling ,and monitoring of the pregnant women risk group are of particular importance for adopting a low calorie/low glycaemic diet and avoiding a sedentary behaviour. Long term follow up of the mother and the microsomic baby is required because of the risk of obesity, diabetes, hypertension and metabolic syndrome later in life. Biratu,Wakgari and Jikamo (2018:5) further recommended that obstetric care providers should assess all pregnant women for history of foetal macrosomia which would help them to be prepared for the managements of maternal and perinatal complications.

2.5.3 Global context regarding foetal growth monitoring as a strategy to curb perinatal mortality

Recent evidence indicates that a higher frequency of ANC contact by women and adolescents' girls with health care providers is associated with reduced likelihood of still births because of increased opportunity to detect potential complications (WHO 2017). One of the aims of ANC is to monitor the wellbeing of the foetus in utero. The problems that may lead to inaccurate foetal monitoring are late booking, inconsistent clinic attendance and change of staff (Sellers 2012). Strengthening the capacity of midwives to deliver high quality maternal and new-born health services has been highlighted as a priority by global health organisations (Sellers 2012).

SFH measurement is a simple and inexpensive clinical activity, widely used during ANC in both high- and low-income settings worldwide particularly in low- and middle-income countries, where access to ultrasound machines and trained ultrasonographers is limited (Papageorghiou *et al.* 2016). Papageorghiou *et al*. (2016) state that the SFH is beneficial in low-risk pregnancies where serial measurement of SFH is recommended as a simple, inexpensive first level, screening tool. Standard practice in several countries such as the United Kingdom, Indonesia, and South Africa during ANC is the use of foetal growth by midwives and doctors in all healthcare facilities in maternity departments in order to monitor the growth of foetus while in utero (Lawes and Jones, 2020; Anggraini, Abdollahian and Marion 2020; South Africa, National Department of Health 2016). O'Gorman and Salomon (2018) acknowledge the importance of the introduction of foetal growth charts into routine ANC on the basis that foetal size and growth trajectories are pertinent indicating factors of foetal health. A foetal growth chart is a vital tool for assessing foetal risks during pregnancy (Anggraini, Abdollahian and Marion 2020). Although at least 21 different, locally derived SFH charts are currently being used in clinical practice worldwide, Papageorghiou *et al.* (2016) developed the new international SFH standards which should be used in combination with standardised measurement methodology to unify and improve clinical practice and plot measurements in the medical records to identify women who require referral for an ultrasound scan. O'Gorman and Salomon (2018) state that there are many published foetal growth charts available so the choice of chart used requires careful consideration. The impact of utilising a growth chart in clinical practise has been investigated in Indonesia where the results showed a significant improvement in detection of abnormal

growth and a remarkable reduction in unnecessary referrals (Anggraini, Abdollahian and Marion 2020).

2.5.4 National context regarding foetal growth monitoring as a strategy to curb perinatal mortality

Traditionally abdominal palpation, SFH measurement and ultrasound scanning has been used to monitor foetal growth. However, there are a number of tools that are now used nationally to monitor foetal growth, including the use of customised growth charts, clinical examination/abdominal palpation, abdominal palpation of fundal height in relation to anatomical landmarks such as the umbilicus and xiphisternum, SFH measurement using a tape measure, ultrasound scanning and abdominal girth measurement. In low resource areas where access to ultrasound is poor, abdominal palpation and SFH measurement are the only methods readily available (Wanyonyi and Mutiso 2018).

The technique of SFH measurement was first described by Spiegelberg in the German literature in 1891 and was originally meant to detect the growth-restricted foetus rather than to estimate the gestational age. (Mongelli 2018). The challenge with SFH measurement is that it is subject to significant intra- and inter-observer variation and can be distorted by other factors such as a full bladder and morbid obesity (Peter *et al.* 2015). This makes the skill of the health provider who is measuring, recording and interpreting very important. Thus, the intention of the researcher in the proposed study was to explore and describe the use of SFH measurement by the midwives from selected ANC clinics in eThekwini district, KZN to monitor foetal growth.

It is critical that the SFH measurement is done accurately, and findings plotted accurately onto the SFH graph to allow accurate interpretation. Correct estimation of gestational age remains an integral component of quality prenatal care because it allows for proper scheduling of prenatal care, informs decision-making at different stages of pregnancy, and is key to correct interpretation of foetal growth parameters (Wanyonyi and Mutiso 2018). According to Wanyonyi and Mutiso (2018), in the absence of reliable estimation of gestation age, situations where appropriately grown foetuses are erroneously labelled as small or large for gestational age or growth-restricted pregnancies may be allowed to progress on the assumption that the dates were wrong. Wanyonyi and Mutiso (2018) state that an error in measurement, plotting and or interpretation can result in an inaccurate estimation of gestational age and subsequently growth

monitoring becomes difficult and inaccurate, all of which may result in inappropriate interventions such as premature induction of labour or prolonged pregnancies.

2.5.5 South African context regarding foetal growth monitoring as a strategy to curb perinatal mortality

Nove *et al.* (2020) revealed that in South Africa, in line with the target set in the NDP the Department of Health has identified maternal health care as a priority area requiring urgent action. The PPIP was developed in the late 1990s and implemented as a strategy to improve perinatal care. The PPIP has an audit tool that is used in all maternity departments to analyse perinatal deaths and identify possible causes of death (Noge 2018).

The manual for clinics, community health centres and district hospitals (South Africa, Department of Heath 2016) prescribes the use of SFH measurements to monitor foetal growth at all levels of maternity care. At every ANC visit SFH measurements should be done as part of the routine examination of pregnant women by measuring the distance in centimetres from the highest point of the fundus of the uterus to the superior border of the symphysis pubis. The findings are then plotted on the SFH graph (growth chart) against the gestational age and compared with the 10^{th}, 50^{th} and 90^{th} percentiles for gestational age and with previous measurements (South Africa, Department of Health 2016). A woman is considered to have a SGA foetus if a single SFH plots below the 10th centile or serial measurements demonstrate slow or static growth, and a LGA foetus if the SFH plots above the 90^{th} centile (Wanyonyi and Mutiso 2018).

2.6 INVOLVEMENT OF MIDWIVES IN MATERNITY CARE SERVICES

According to the South African Nursing council, A midwife is a licensed person who is registered with the South African nursing council base on the completion of a recognised education and training programme to nurture, assist and treat the clients, who can be a woman, neonate or family, in the process of promoting a healthy pregnancy, labour and post-partum period. The functions of a midwife are divided into four main areas which are: expert clinical practise, clinical and professional leadership, research, and education (DHSC 1999 cited in Wilson 2018: 254). Haran and Everett (2017: 44) concurs that one of the objectives in obstetrics is to provide holistic and multidisciplinary antenatal care thus ensuring that input from midwives and clinicians alike lead to a safe neonatal outcome. Provision of such care relies on accurate

assessment of foetal wellbeing.Furthermore, the SANC reports that scope of practice of a registered midwife shall entail the prevention of disease related to pregnancy, labour and puerperium and the promotion of health and family planning by teaching and counselling individuals and families, by implementation of family planning skills, and by monitoring the health status of the mother and child. The scope of practice for midwives is clearly stated by the SANC but midwives are still facing challenges while carrying out these duties more especially in monitoring foetal wellbeing during pregnancy. Problems that may lead to inaccurate foetal monitoring are late booking, inconsistent clinic attendance and change of staff (Sellers 2012: 206-207). As a practising midwife I have observed poor in-service education about midwifery related issues, failure to use maternity guidelines, policies and protocols as reference guide, lack of information from a pregnant woman, unavailability of transport (ambulances) in case of referring an emergency to a referral institution, as well as shortage of staff. In PHC settings these are huge challenges.

2.6.1 Factors influencing practices of midwives in public health care institutions

Midwifery services are crucial in a community because of their role in producing healthy mothers and babies thus reducing neonatal and maternal morbidity. Decreasing maternal and perinatal death rates is the prerogative of the midwives, hence the development of implementation of the maternity guidelines (Gcawu 2012: 20). Several studies have reported factors influencing midwifery services. According to Behruzi *et al.* (2017: 2), maternity care practice is characterised by close operation between obstetricians, midwives, family physicians and nurses, nevertheless, conflict has been reported between many health care professionals. Lumadi and Matlala (2019: 2) reported that the shortage of midwives in the public sector influences maternal care outcomes in a negative manner. The authors further commented that poor quality workplaces weaken the ability of institutions to meet their performance targets and quality healthcare outcomes, and make it more difficult to attract, motivate and retain staff. Many hospitals in South Africa that provide services to thousands of pregnant women annually experience a shortage of qualified midwives. To combat shortages in the public sector, administrators often deploy nurses who are not midwives to maternity sections (Hastings-Tolsma *et al.* 2021: 2). Behruzi *et al.* (2017) suggested that the need for multidisciplinary maternity care and inter-professional collaboration is obvious, as it helps to solve the shortage of care providers in the maternity care system.

2.6.2 Influences of midwives' non-compliance on maternity health outcomes

Midwifery malpractices occurring during intrapartum care are on the rise; of all the case reported to the SANC in 2013, 47% were midwifery-related and this percentage increased to more than 50% in 2014 (Sumbane, Digamela and Mbokazi 2017: 11). Access to ANC gives a pregnant woman the opportunity to benefit from care services including health promotions, screening and diagnosis for abnormalities that can pose risk to the life of her unborn child and herself (Nxiweni *et al*. 2022: 286). If midwives are not compliant regarding the services they provide, this can lead to poor antenatal care. Mathibe-Neke and Mashego (2022:18) pointed out that midwives carry responsibilities and accountability for their midwifery practice, therefore they are mandated by the code of ethics to provide an ethically acceptable standard of practice. Sumbane, Digamela and Mbokazi (2017: 11) reported that malpractice contributed to South Africa's failure to meet the MDG 4 and 5 in 2015, therefore it won't be easy for us as a country to reach the SDG 3 target which is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births.

2.7 CHAPTER SUMMARY

Chapter 2 presented a review of literature deemed relevant to the current study. The next chapter presents the theoretical framework used to guide the study.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 INTRODUCTION

Chapter 3 presents the theoretical framework that will be used to guide the study. The researcher begins this chapter with a brief description of theories and the importance of using theories as frameworks to guide scientific enquiries. The theory of behaviour (TPB) is presented as a theoretical framework that will be used to guide the study and details on how it will be used are described.

3.2 USE OF THEORIES IN SCIENTIFIC RESEARCH

In research, a number of theories have been developed by different scientists to draw connections, explain phenomena, and make predictions (McCombes 2020). These are available within specific disciplines such as nursing, psychology, education etc. Although discipline specific theories exist, selected theories can be applied across disciplines, or, due to the nature of the study the researcher can borrow and adapt the theory from one discipline to another (Grant and Osanloo 2014). Polit and Beck (2021: 805) define a theory as an abstract generalisation that presents a systematic explanation about relationship among phenomena or that thoroughly describes a phenomenon. Theories provide complex and comprehensive conceptual understandings of things that cannot be pinned down (such as how societies work, how organisations operate, why people interact in certain ways) and give researchers different lenses through which to look at complicated problems and social issues, focusing their attention on different aspects of the data and providing a framework within which to conduct their analysis (Reeves *et al*.2008). According to these authors, a theory can be used to help design a research question, guide the selection of relevant data, interpret the data, propose explanations of causes or influences which aid the researcher to organize phenomena, predict what will happen in new situations, and generate new research. In principle this implies that theories are used as frameworks to guide research project. Kivunja (2018: 46) describes a theoretical framework as a structure that can hold theory of a research study comprising of theory/s expressed by experts in the field into which the research project is planned, and from which the researcher/s draw to provide a theoretical coat hanger for data collection, analysis and interpretation of findings.

According to Sabatier (2007 cited by Nilsen 2015), frameworks do not provide explanations but describe empirical phenomena by fitting them into a set of categories and provides a structure, overview, outline, system or plan consisting of various descriptive categories, such as concepts, constructs or variables, and the relations between them that are presumed to account for a phenomenon. Grant and Osanloo (2014) attest that the theoretical framework is one of the most important aspects in the research process because a strong framework with a strong theoretical basis enhances investigations that lead to the achievement of specific study goals. In view of all the above, the researcher consulted several nursing and non-nursing theories to identify a suitable one to use as a framework for the planned study. The TPB was deemed most appropriate to guide the planned study.

3.3 THEORY OF PLANNED BEHAVIOUR (TPB)

The TPB is a middle range theory that links the beliefs of an individual to their behaviour, first proposed in 1980 and revised in 1985 from the idea that was first proposed by Icek Ajzen. This theory allows for the predictability of reasoned actions when behavioural controls are in place. The TPB has been used as an underlying theory for studying health decision making behaviours and in developing health promotion interventions (Ajzen 1985).

3.3.1 The 3-step process to behaviour

According to Ajzen's theory, there is a 3-step process which people take to plan their behaviours. If there are positive responses in all three steps, then a person is most likely to decide to go through with their planned behaviour. When there are negative responses a person is most likely to decide to not go through with that behaviour (Ajzen 1985). The three steps suggested by Ajzen are:

- An action is evaluated to determine if the behaviour can be seen as positive.
- There is an evaluation to determine if there is a significant group of other people who would want to have the behaviour performed.
- The higher intention or motivation of the behaviour is evaluated to determine if a positive personal outcome can be achieved.

According to Ajzen (1985), people have two types of beliefs: normative and subjective. Normative beliefs are those that are independently developed and help to define a personal moral code, while subjective beliefs are the perceptions that can be influenced by judgments or

observations that others may provide. Furthermore, within each belief system, there are control beliefs and perceived behavioural controls.

The control beliefs are attitudes towards the behaviours, (subjective norms) and may be real, perceived, or imaginary. These look at the factors which make it possible or impossible to perform a planned behaviour. Therefore, the control beliefs impact the final decision that an individual makes. People have two different attitudes toward behaviour, one based on a definition of behaviour they give to it that comes from their own belief systems, and the other coming from the perspectives of an individual's social groups and networks (Ajzen 1985). The perceived behavioural controls on the other hand are the individual's observations about how easy or difficult it is to manipulate the factors which help or hurt the decision to pursue a planned behaviour (Ajzen 1985).

Furthermore, Ajzen (1985) attests that social influence creates planned behaviours and highlights the three specific influences that can affect the decision to act upon a specific definition of a planned behaviour as: subjective social group norms, subjective family group norms and subjective societal norms.

In line with the fact that for every action there is an equal and opposite reaction, under the concept of perceived behavioural control, Ajzen (1985) states that for every action, there is a planned and anticipated response which will occur, and each person has certain expectations about behaviours that may come from the motivation behind a planned behaviour, the performance of the behaviour, or the feelings which initiate the decision to consider the behaviour in the first place. Therefore, either success or failure can be expected based on the planned behaviours (Ajzen 1985). Figure 3.1 present a diagrammatic presentation of the TPB.

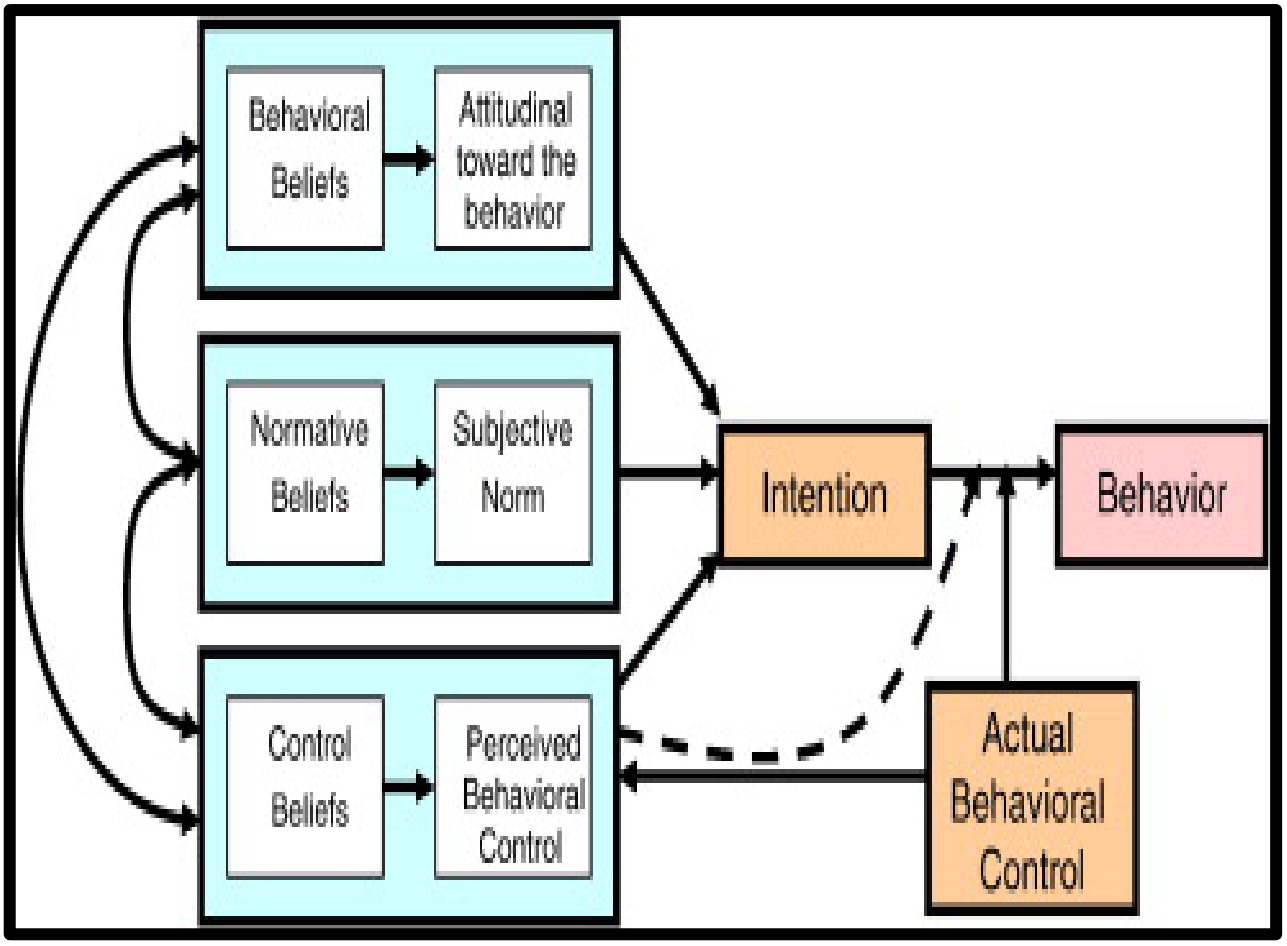

Figure 3.1: Diagrammatic presentation of the TPB
(Source: Ajzen 1985).

3.4 USING THE THEORY OF PLANNED BEHAVIOUR AS THE FRAMEWORK TO GUIDE THE STUDY

Kivunja (2018) states that the theoretical framework is a structure that can hold the theory of a research study, and Scott *et al.* (2008) state that a theory can be used to help design a research question, guide the selection of relevant data, interpret the data, and propose explanations of causes or influences, all of which aid the researcher to organize phenomena, predict what will happen in new situations, and generate new research. The TPB fulfils this purpose, and was used to decide on the objectives of the study and to plan and conduct data collection, analysis, interpretation and reporting of the study.

3.4.1 Development of the objectives of the study

The theory assisted the researcher to decide on the objectives for the planned study. For example, the first and second objectives, which include determining the attitudes of midwives towards and exploring their current practices in the use of SFH management to monitor foetal growth during pregnancy, were set with an understanding that according to the TPB, attitudes towards the behaviours impact the final decision that an individual makes regarding the task at hand. The researcher considered that attitudes of midwives toward the use of SFH in monitoring foetal growth could impact their performance of this activity.

3.4.2 Planning and implementation of the data collection process

The TPB also informed the decision of the researcher to employ a qualitative research design to collect data using semi-structured interviews with the midwives, and the development of the interview guide. In line with the three steps suggested by Ajzen (1985), the interview guide included questions to evaluate the following:

- ✓ Whether the practice of using SFH measurement to monitor foetal growth would be seen as positive (current practices of midwives).
- ✓ If there is a significant group of other people who would want to have SFH measurement used to monitor foetal growth performed.
- ✓ The higher intention or motivation of the behaviour to determine if a positive personal outcome can be achieved with using SFH measurement to monitor foetal growth (attitudes of midwives towards action).

3.4.3 Data analysis, interpretation, reporting and recommendations

The theory was used to organise the findings from data analysis in order to enhance interpretation and to show achievement of the study objectives. Together with the literature reviews the theory was also used to support the findings from data analysis. The theory assisted the researcher in structuring recommendations and drawing conclusions from the study. Currently there is anecdotal evidence as witnessed by the researcher that the growth chart contained in the maternity case record of pregnant women is not accurately completed. This anecdotal evidence highlights inappropriate use of SFH to monitor foetal growth. Guide by the theory, the researcher was able to better explore and possibly find answers to decision making behaviours of midwives and propose recommendations and interventions that can promote

accurate use of SFH measurement to monitor foetal growth. Table 3.2 presents application of the TBA in the planned study.

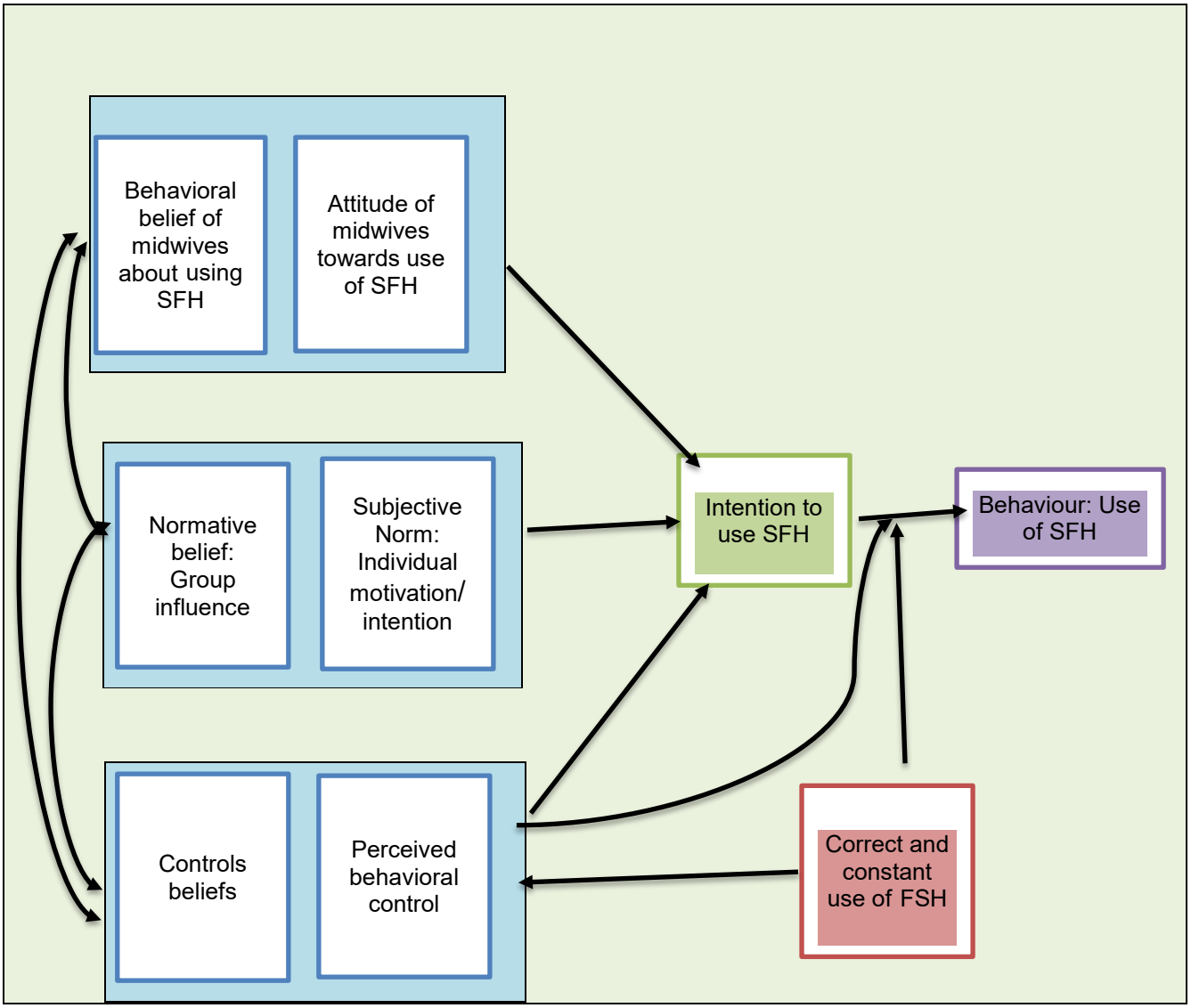

Figure 3.2: Application of in the planned study
Source: Adapted from Ajzen (1985)

3.5 CHAPTER SUMMARY

Chapter 3 presented the theoretical framework that will be used to guide the study. The next chapter will present the research methodology that was employed to conduct the study.

CHAPTER 4: RESEACH METHODOLOGY

4.1 INTRODUCTION

This chapter describes the methodology that was adopted to conduct the study. Igwenagu (2016: 4) defines research methodology as a systematic, theoretical analysis of the methods applied to the field of the study. This definition concurs with the description of Keeves (1997 cited by Kivunja and Kuyini 2017: 28) that research methodology as a broad term is used to refer to the research design, methods, approaches, and procedures used in an investigation to find answers. In line with these two definitions, the researcher in this chapter describes the research design that was adopted for the study and presents a step-by-step description of the methods, approaches, and procedures that the researcher used in exploring the use of SFH measurement to monitor foetal growth in selected ANC clinics in eThekwini one of the eleven Districts in KZN with the hope of determining the factors affecting and the strategies, and enhancing, the use of this method of measurements to monitor foetal growth during pregnancy. Therefore, in this chapter, the overall plan for addressing the four research questions that were employed to enhance the integrity of the study are presented (Polit and Beck 2021: 733).

4.2 RESEARCH DESIGN

A qualitative research design was adopted for the study. Shea and Yanow (2011: 16) define the research design as the basic structure of research project, the plan for carrying out the investigation focused on the research questions as the central concern for a particular phenomenon. This definition concurs with several researchers including Creswell (2014) and Polit and Beck (2021) who further clarify that various research designs which include qualitative, quantitative, and mixed methods exist, each of which are specific and unique from each other in various ways. Furthermore, Grove, Burns and Gray (2013: 43) describe the research design as the blueprint of the study that controls factors that can influence the validity of the findings.

4.2.1 Qualitative research

Qualitative research design is a design which seeks to explore human experiences to understand the reasons behind the behaviour and meanings embedded in those experiences

(Holland and Rees 2010: 43). It is the systematic inquiry into social phenomena in its natural settings that can include, but is not limited to, how people experience aspects of their lives, how individuals and/or groups behave, how organizations function, and how interactions shape relationships (Teherani *et al.* 2015). The researcher chose a qualitative design to aid in better understanding the reasons behind the behaviour and meanings embedded in the behaviours of nurses in using the SFH measurement to monitor foetal growth. The qualitative descriptive research design assisted the researcher to find answers to the questions posed with regards to the use of SFH measurements to monitor foetal growth which included:

- What were the current practices of midwives at selected ANC clinics in eThekwini District regarding the use of SFH measurements to monitor foetal growth?
- What were the attitudes of midwives at selected ANC clinics in eThekwini District towards the use of SFH management to monitor foetal growth?
- What challenges were experienced by the midwives at selected ANC in eThekwini District with the use of SFH management to monitor foetal growth?
- How could the use of SFH measurement to monitor foetal growth during pregnancy be enhanced in the selected ANCs in eThekwini District?

4.2.2 Descriptive research approach

Of the different approaches available to conduct qualitative studies, the descriptive approach was deemed appropriate for the study. Teherani *et al.* (2015) state that qualitative scholars develop their work from post-positivism or constructivism using different approaches to conduct their research such as grounded theory, ethnography, phenomenology, etc. According to Grove, Burns and Gray (2013), a descriptive design is crafted to gain more information about the characteristics within a particular field of study and can be used to develop theory, identify problems with current practice, and make judgments. The researcher selected this approach to identify problems with current practice and make judgments regarding the use of SFH measurements in monitoring foetal growth.

4.3 RESEARCH PARADIGM

In research, a paradigm is a worldview, a way of looking at natural phenomena that encompasses a set of philosophical assumptions that guide one's approach to the inquiry under study (Polit and Beck 2021:13-15). Several authors concur that the researcher's

paradigm/worldview is essential for accurately positioning the research subject under study (Polit and Beck 2021; Teherani *et al.* 2015). These authors differentiate between positivists, post-positivist, and constructivist paradigms. The fundamental assumption of the positivist paradigm is that there is a reality out there that can be studied and known. The post-positivist researchers agree with the positivist paradigm, but believe that environmental and individual differences, such as the learning culture or the learners' capacity to learn, influence this reality, and that these differences are important. The constructivist researchers sometimes referred to as naturalist believe that there is no single reality, but that the researcher elicits participants' views of reality (Teherani *et al.* 2015).

Although qualitative research generally draws on post-positivist or constructivist beliefs, Teherani *et al.* (2015) advise that alignment between the belief systems underpinning the research approach, the research question, and the research approach itself should be a prerequisite for rigorous qualitative research. Having decided on a study adopting a qualitative descriptive research design the researcher's position was aligned with the post positivist paradigm as this paradigm is mostly allied to qualitative research. The researcher believed that although there is the reality about the use of FSH in monitoring foetal growth, environmental and individual differences, such as the learning culture or the learners' capacity to learn, which in the case of this study were the midwives working in PHC clinics, influenced this reality. These differences were deemed by the researcher as important to enhance the correct use of SFH measurement to monitor foetal growth during pregnancy. Thus, the aim was to collect data from midwives as individuals participating in this activity.

4.4 GEOGRAPHIC AREA WHERE THE STUDY WILL BE CONDUCTED

A study setting is a physical location in which data collection takes place, or an overall location where a study is undertaken (Polit and Beck 2021). The study was conducted in eThekwini district in the KZN province of South Africa.

EThekwini, formerly known as Durban, is the only Category A metropolitan local government authority found in the KZN province in South Africa. It is one of the four coastal metropolitan local government authorities in South Africa together with Cape Town, Nelson Mandela Bay, and Buffalo City. The eThekwini Metropolitan area is located on the east coast of South Africa in the Province of KZN and is the third largest metropolitan local government authority in the

country following Johannesburg and Cape Town. The map in Figure 4.1 shows the location of eThekwini district in KZN.

EThekwini District spans an area of approximately 2 555 km^2 and shares boundaries with three districts: Ugu to the south, iLembe to the north and uMgungundlovu to the west. The eThekwini Health District has a population of 3.44 million according to the South African census that was last done in 2011 and 31 million of the population are Zulu people (KwaZulu Department of Health 2015: 8). The greatest population concentrations occur in the central and northern regions of eThekwini and the metro's population is projected to increase to 4.15 million by 2024. According to the 2016 Stats South Africa Community Survey, 51% of the eThekwini population is female. The median age of the metro is 27 years of age which is higher than that of KZN (22 years) and 10% higher than the figure for South Africa (25 years). Fifty five percent of the population is between the ages of 20 and 59 years, while 8% of the population is older than 60 years. The black African population group makes up the majority of the eThekwini population at 74% followed by the Indian population at 18% and the white and coloured populations representing the minority groups at 6% and 2% respectively. Female deaths in eThekwini are largely associated with non-communicable diseases (NCDs) at 46%, HIV and TB (6%). Other communicable diseases together with perinatal, maternal, and nutritional conditions account for 20% of deaths (KwaZulu Department of Health 2015: 8).

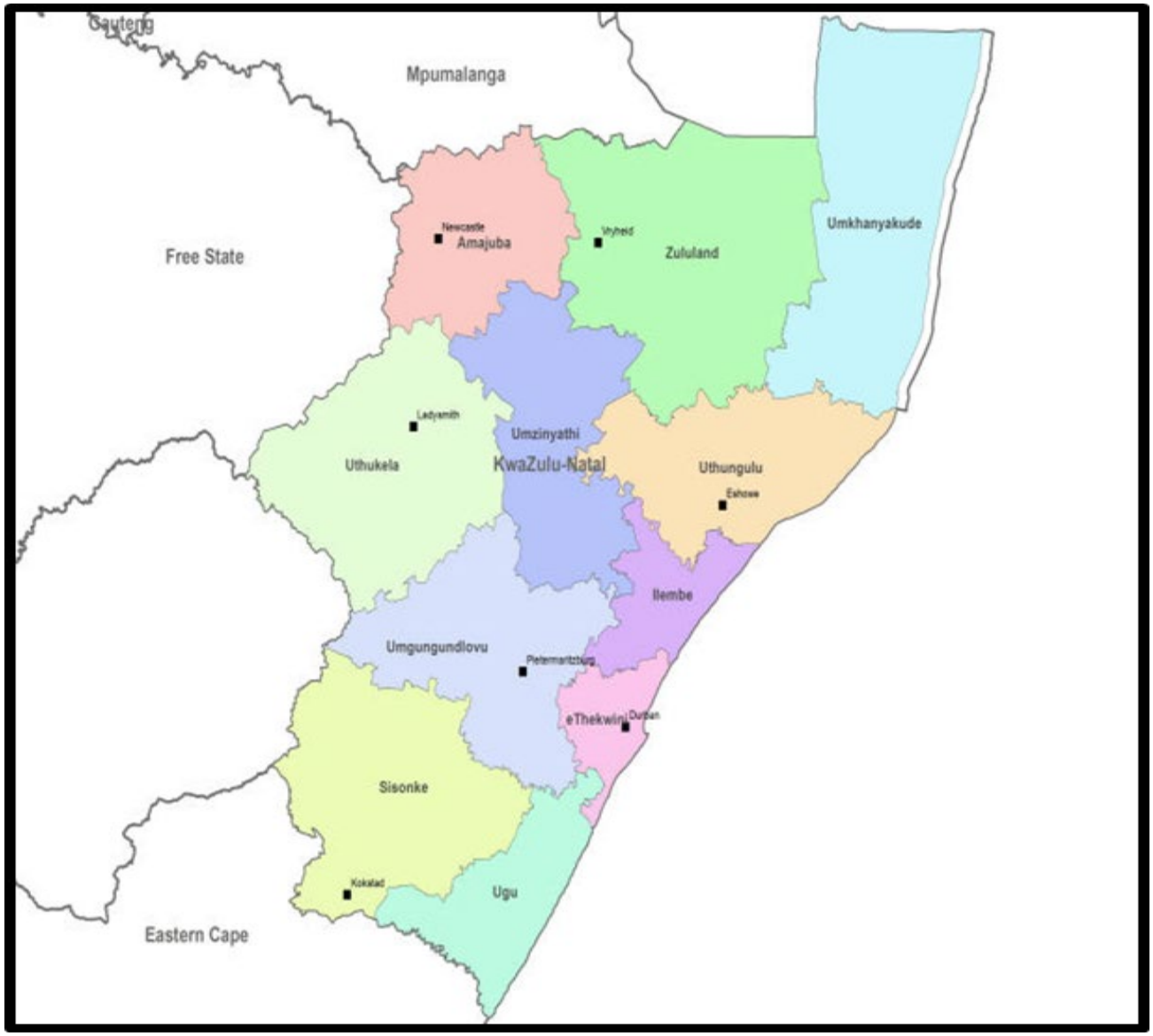

Figure 4.1: Map showing the KZN District
Source: Google Maps

Health care services in the eThekwini district are provided by private, semi-private and government health care institutions. The focus of the study was on health care services provided in the government health care institutions commonly referred to as public health care institutions and are referred as such throughout his study.

At the time of the study, the public health care institutions in eThekwini district were administered jointly by the KZN Provincial Department of Health and the local government administration also known as eThekwini Municipality Health Unit with the former contributing to 60% and the latter to 40% of public health care services in the district. At the time of the study,

the KZN Provincial Department of Health was responsible for administration of a variety of health institutions including 43 clinics which included the PHC clinics and Community Health Care Centres (CHC), Midwife Obstetric Units (MOUs); three district hospitals; five regional hospitals, one provincial tertiary hospital and one national central hospital. The eThekwini Municipality was responsible for administration of health care clinics which included PHC clinics, health posts and mobile clinics.

To facilitate administration and control of public health care services, eThekwini District was divided into three sub-districts; the south, the west and the north sub-districts. The map in Figure 3.2 shows the three sub-districts in eThekwini District (Source: Google Maps).

The PHC services were available as the first entry point into public health care services. There were 104 PHC clinics available as part of public health care services in eThekwini district distributed in the three sub-districts as follows: 47 PHC clinics in the South, 29 in the North and 28 in the West sub-district. There were 59% (n = 61 clinics) administered by the eThekwini Municipality and 41% (n = 43 clinics) administered by KZN Provincial Department of Health (KZN Department of Health 2010). The targeted study sites were the eThekwini Municipality PHC clinics.

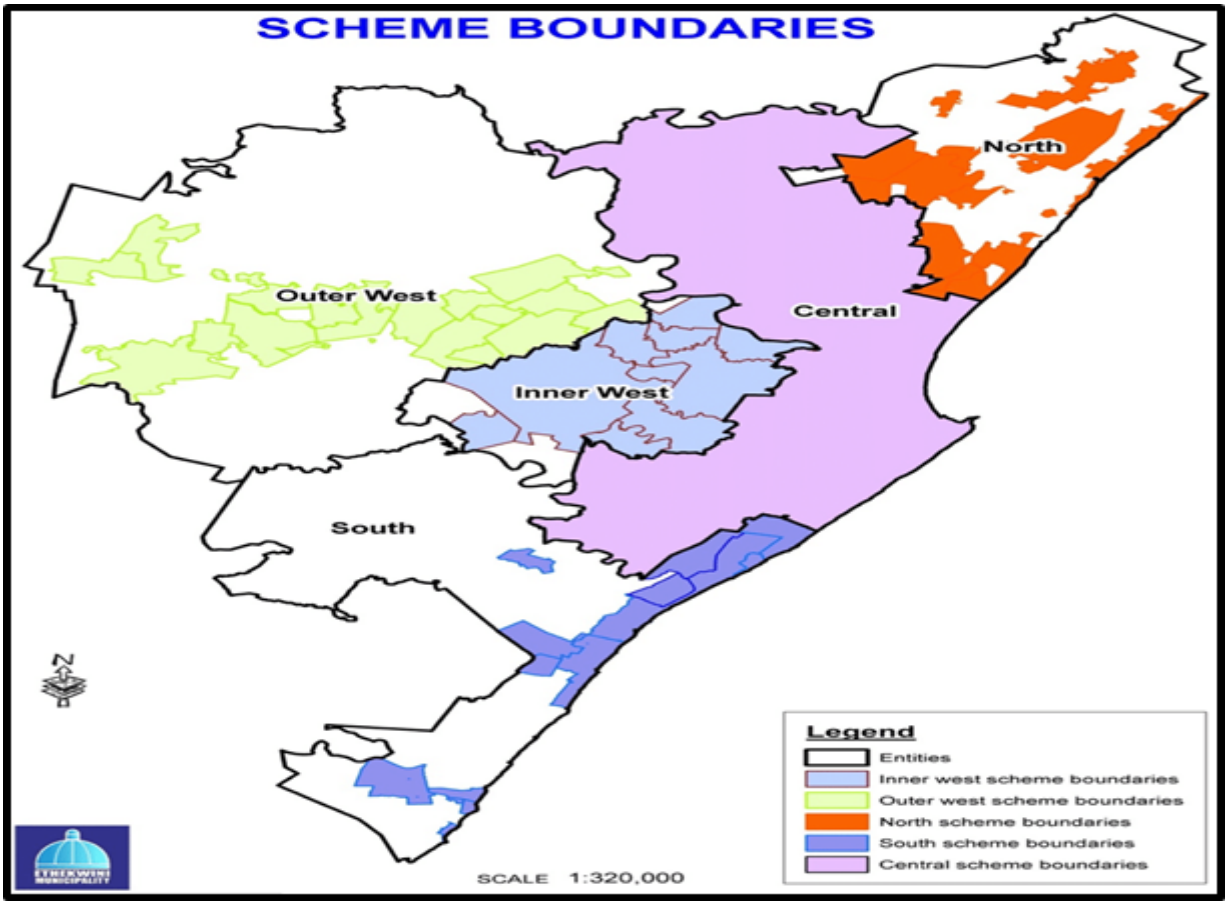

Figure 4.2: Map showing the eThekwini sub-districts
Source: Google Maps

4.5 STUDY POPULATION

Population is the entire set of individuals or objects having some common characteristic (Polit and Beck 2021). The population in the current study were the ANC clinics, the midwives working in the ANC clinics within the selected eThekwini Municipality PHC clinics, and maternity case records for pregnant women who were attending ANC clinics at the time of the study.

4.5.1 ANC clinics

Services within PHC clinics were organised according to different speciality programmes sometimes referred to as PHC streams which varied from PHC clinic to PHC clinic and often included ANC, childcare, tuberculosis, HIV, minor ailments, chronic care, etc. to ensure a comprehensive package of health care services. Thus, ANC clinics were located within the PHC clinics. ANC services within these clinics were provided by the registered midwives.

It is imported to note that ANC services were also available in hospitals and community health care health care centres, MOUs and health posts. However, these health care institutions were not included as study sites. The hospitals MOUs and CHCs were not included because none of these health care facilities existed in the eThekwini Municipality Health Unit. The health posts and mobile clinics were also not included because although these were under eThekwini Municipality Health Unit, ANC services provision in these clinics were administered differently to PHC clinics. The focus of the study was on ANC clinics located within PHC clinics that were under eThekwini Municipality administration.

4.5.2 Midwives population

Registered midwives in the selected PHC clinics who were actively involved in the provision of ANC services were identified as participants. The midwife population included nurses who were qualified and registered with the SANC either as midwives or advanced midwives. Because the focus of this study was on midwifery skills, the study participants are collectively referred to as midwives throughout the study.

The ANC services in the PHC clinics were provided as part of a comprehensive package of health care service in accordance with the WHO Alma Ata declaration on primary health care (WHO 1978). Different approaches were adopted by different PHC clinics; some PHC clinics adopted an integrated approach commonly referred to as the one stop shop or supermarket approach while others offered maternal care services (ANC and PNC) as a vertical programme separate to other health care services.

Where an integrated approach was used, all clients in the clinic followed one queue and were attended to by midwives who were also registered nurses on a first-come-first serves basis. All staff who were qualified in general nursing and midwifery consulted with all the clients presenting in the PHC clinics. The number of midwives who were qualified and registered with SANC as both professional nurses and midwives differed from clinic to clinic depending on the size of the clinic, services offered, and average daily headcount of the client attendance. On average the minimum number of these midwives in each PHC clinic was five and the maximum was eight.

Where ANC services were provided as a vertical programme, midwives were allocated to attend to ANC clients either daily or on specific days. The number of midwives allocated depended on

the staff establishment and average headcounts for ANC clients. On average the minimum number of staff allocated per day per PHC clinic was five and the maximum was ten.

4.5.3 Maternity case records

Maternity case records for pregnant women who were attending ANC at the time of data collection were used. Permission for retrospective record review was received from both the eThekwini Municipality Health Unit Head (Appendix 2A) in respective of pregnant women. Maternity case records for pregnant women who had attended for ANC care at least three times after 20 weeks gestation were sampled (see inclusion and exclusion criteria). This inclusion criterion was important because SFH measurement should be done after 20 weeks gestation (South Africa, Department of Health 2016). Thus records for women who were less than 20 weeks gestation would not have the SFH recorded. Furthermore, selecting records for women who had attended more than three times assisted in verifying patterns of plotting and interpretation thereof.

4.6 IDENTIFICATION OF STUDY PARTICIPANTS

Identification and recruitment of the study participants commenced after the researcher had received full ethical approval from the Durban University of technology Institutional Research Ethics committee (IRE 096/22) (Appendix 1A) and gate keeper permission to conduct the study in the eThekwini Municipality PHC clinics from eThekwini Municipality Health Unit Research Committee. The gatekeeper permission included permission for retrospective record review. The eThekwini Municipality Health Unit Research Committee issued a support letter (Appendix 2B) which served as gatekeeper permission and requested the researcher to sign an indemnity form before commencing data collection (Appendix 2C). The pregnant women had to sign an informed consent form granting permission for their records to be reviewed. The consent form was available in English and IsiZulu (Appendices 3C and 3D).

The researcher arranged through each sub-district Deputy Head of Health a slot in the monthly sub-district management meeting to inform the management team about the study. The purpose of these sub-district information giving sessions, was to inform the management team which included the deputy heads of health, the area managers, and the operational managers about the study in order to facilitate facility access to the selected PHC clinics for recruitment and data collection.

Subsequently, information giving sessions were conducted for all staff in selected PHC clinics to ensure that they were all aware of the study taking place in their respective clinics. The researcher liaised with the operational managers for each of the selected PHC clinics to meet with the clinic staff during the routine clinic staff meeting to inform them about the study. The PHC staff were advised about the timing of data collection and the targeted study population.

4.7 SAMPLE AND SAMPLING TECHNIQUE

Polit and Beck (2021) define sampling as the process of selecting a portion of the population to represent the entire population. Both quota and purposive sampling methods were used to identify the study participants.

Quota sampling was used to ensure that ANC clinics were sampled from each of the three eThekwini sub-districts. This allowed generalisation of findings to all the ANC clinics under eThekwini Municipality administration.

A purposive sampling method was adopted to sample the ANC clinics, midwives, and maternity case records, as follows:

- *ANC clinics:* That only ANC clinics are sampled from the different speciality clinics available in the selected PHC clinics.
- *Midwives:* That the researcher select the participants who are experts in the area of the study and who will be able to provide the rich information about the issue under study.
- *Maternity case records*: That the researcher select maternity records that will be able to provide the required information about the issue under study.

Details on the sampling process for each of the three population groups (ANC clinics, midwives, and maternity case records) are provided in the next section.

4.7.1 Sampling technique

4.7.1.1 Sampling of ANC clinics

ANC clinics located in the PHC clinics under eThekwini Municipality administration from three sub-districts in eThekwini district were sampled for inclusion as data collection sites. These were identified using a two phased sequential sampling method (quota and purposive) as follows:

Phase One: Quota sampling of PHC clinics from the three sub-districts

During this phase PHC clinics under eThekwini Municipality administration were grouped according to the three sub-districts in eThekwini District. The quota sampling method was used. Quota sampling is a non-probability sampling method in which the researcher creates a sample involving individuals that represent a population according to the specific traits or qualities so that the market research samples can be useful in collecting data (Polit and Beck 2021:342). This ensured that eThekwini Municipality ANC clinics from three sub-districts in eThekwini District were included so that findings from the study could be generalized to the entire population (eThekwini District PHC clinics under eThekwini Municipality administration).

At the beginning of the sampling the weight of the subgroups (from the three sub-districts) was similar in that an equal number of PHC clinics were sampled from each sub-group (minimum four PHC clinics per sub-district) to be used as data collection sites. The researcher anticipated that the weightage could possibly change during data collection as data saturation was monitored differently for each sub-district thus could be reached at different points for different sub-districts which indeed happened (see presentation of finding for details).

Phase two: Sampling of ANC clinics from the PHC clinics

Purposive sampling method was used to identify and sample the ANC clinics from the speciality programmes located within the sampled PHC clinics. The inclusion and exclusion criteria as detailed in section 4.7.2 guided sampling of ANC clinics and the sample size was guided by data saturation as detailed in section 4.7.3.

4.7.1.2 Sampling of midwives

Midwives working in the sampled ANC clinics were included in the study. The midwives population included registered midwives, and advanced midwives. Because the focus of this study was not on qualification but on the midwifery skills the study participants are collectively referred to as midwives throughout the study reporting. The number of midwives differed in each ANC clinic depending on the approach to health care services provision, the size of the clinic, services offered and average daily headcount of the client attendance.

In accordance with the WHO Alma Ata declaration on primary health care (WHO 1978), different approaches to service provision were adopted by different PHC clinics where some PHC clinics

adopted an integrated approach commonly referred to as the one stop shop or supermarket approach, and others offered different speciality programmes as a vertical programme.

Where an integrated approach was adopted, all clients in the clinic irrespective of type of health care service/s required, followed one queue and were attended to by professional nurses (registered nurses and midwives) on a first-come-first-served basis. All staff who were qualified in general nursing and midwifery consulted with all the clients presenting in the PHC clinic including those coming for ANC services. On average the minimum number of midwives in these PHC clinics ranged between five and fifteen.

Where ANC services were provided as a vertical programme, midwives were allocated to attend to ANC clients either daily or on specific days. On average the minimum number of midwives allocated in vertically run ANC clinics was one to two midwives per clinic session.

During the information giving session in each PHC clinic, the prospective participants were advised that the information letters (Appendix 3A) would be made available in each PHC clinic should they require to read further about the study. The hard copies of consent forms were also included with the information letters (Appendix 3B) so that all those participants who agreed to take part in the study could sign an informed consent. These were placed at strategic points negotiated through the operational manager to facilitate accessibility to all prospective participants. Sealable envelopes for participants to put in signed consent forms were also made available. In addition, a sealed box with an opening to allow the participant to deposit the sealed envelopes with signed consent forms was made available in each PHC clinic.

The researcher checked the boxes weekly to retrieve the signed consent forms. The boxes were kept in each PHC clinic for a maximum of three weeks depending on the response rate. The researcher requested from the operational manager a list with names and work contact details of the midwives working in the ANC clinics so as to keep track of the response rate and also to contact the prospective participants on a one on one basis without being coerced should there be a poor response rate.

Thereafter, the researcher conducted individual consultations with prospective participants to identify those who met the inclusion criteria and were willing to take part in the study. The researcher contacted participants who had indicated their interest in taking part in the study

(posted in the box with their signed consent) telephonically during the clinic working hours via the clinic telephone. Suitable dates and times for data collection were negotiated.

In cases of poor response rate (no midwife agreeing to take part in the study from a selected clinic), the researcher contacted the midwives listed in the operational manger's list telephonically to confirm their unwillingness to take part in the study, give them more information about the study and addressing their issues, if any, in an attempt to get them to take part but making sure not to pressurise them.

4.7.1.3 Sampling of maternity case records for document analysis

Maternity case records for the pregnant women who were attending ANC in the sampled ANC clinics were included in the study. Document analysis which involved retrospective record review of maternity case records was used solely to achieve the first objective which is to explore the current practices of the midwives in the use SFH measurement to monitor foetal growth during pregnancy.

The researcher, through the assistance of the midwife in-charge of the ANC clinic, addressed the pregnant women who were attending for ANC care in the selected clinics to request permission to review their maternity case records. Formal permission for record review was granted by the Head of Health as part of gate keeper permission. The midwives working in the ANC clinic assisted the researcher to identify the pregnant women with records that met the inclusion criteria. The researcher ensured that a clear description regarding the purpose and intention of reviewing the maternity records case records was given to the pregnant women and that all their questions and concerns about this process were addressed. Initially pregnant women were addressed as a group in the waiting area and subsequently each of the identified pregnant woman with a suitable maternity case record (meeting the inclusion criteria) was addressed individually. There was no written information letters given to the pregnant women. All pregnant women whose maternity case records met the inclusion criteria and who agree for their maternity case records to be reviewed were required to sign a written consent modified from that used for the midwife participants and available in English and IsiZulu as the two dominant local languages in eThekwini District (Appendix 3C and 3D). The information giving session for pregnant women and record review was done on the same day while the women were awaiting the ANC services

4.7.2 Inclusion and exclusion criteria

The study participants were sampled based on the inclusion and exclusion criteria detailed below.

4.7.2.1 Inclusion criteria

The inclusion criteria for the study participants were the following:

1. ANC clinics located within the PHC clinics under the eThekwini Municipality Administration.
2. Registered midwives working in ANC clinics within the eThekwini Municipality PHC clinics.
3. Maternity case records for pregnant women who had attended for ANC care at least three times after 20 weeks gestation.

4.7.2.2 Exclusion criteria

The following participants were excluded from the study:

1. Private health care institutions in eThekwini district.
2. ANC clinics located within KZN Provincial Department of Health, PHC clinics and other health care facilities such as hospitals, community health care centres, midwife obstetric units and health posts.
3. All other midwives, student midwives and other categories of nurses.
4. Maternity case records for pregnant women who were less than 20 weeks gestation, and those who had attended for ANC care for less than three times after 20 weeks gestation.

4.7.3 Sample size

The sample size for all study participants was guided by data saturation which was monitored separately for each sub-district and for each study population (ANC clinics midwives and maternity case records). Data saturation is the collection of qualitative data to the point where a sense of closure is attained because new data yields redundant information (Polit and Beck 2021).

4.7.3.1 ANC clinics

A minimum of four ANC clinics per sub-district irrespective of data saturation which ensured a minimum of 12 ANC clinics in total. At the point of data saturation within the sub-district one additional ANC clinic sampled to allow one or two further interviews with midwives (depending on availability) and five additional maternity case records for retrospective record review.

4.7.3.2 Midwives and maternity case records

Maximum per ANC clinic instead of minimum number was considered for the midwives and maternity case records.

A maximum of two midwives and five maternity case records was sampled per ANC clinic irrespective of availability and willingness to take part in the study. This maximum restriction for midwives and maternity case records was to facilitate that more ANC clinics rather than more midwives and maternity records from the same ANC clinic were included. This allowed for a wider mix and a deeper and richer enquiry across the entire eThekwini District.

Table 4.1 presents summary of sampling strategy and anticipated population size for the entire study for the various groups of the participants irrespective of data saturation.

Table 4.1: Summary of population size and sampling strategy

Population	Sampling strategy	Number included	Total entire study
Sub-districts	N/A	3	3 sub-districts
PHC Clinics Per sub-district	Quota	4	12 PHC clinics
ANC Clinics per PHC clinic	Purposive sampling	4	12 ANC clinics
Midwives per ANC clinic	Purposive Sampling	1-2	12-24 Midwives
Maternity Case Records per ANC clinic	Purposive Sampling	5	60 Maternity Case Records

4.8 DATA COLLECTION INSTRUMENTS

Two separate data collection instruments both of which were prepared by the researcher were used to collect data. These included an interview guide used to semi-structure the interviews with midwives and the document analysis checklist to use for retrospective document review of maternity case records.

4.8.1 Interview guide

An interview guide is the formal instrument that specifies the wording of questions to be asked in studies collecting structured and semi structured self-report data (Polit and Beck (2021). As recommended by Polit and Beck (2021), the researcher used an interview guide to ensure that the interview was focused and semi-structured. The interview guide was prepared by the researcher guided by the literature review, the objectives of the study and the theoretical framework that was used to guide the study (Appendix 4). The interview guide was prepared in English because the interviews would be conducted in English as the official communication language in the health care institutions in eThekwini District. The guide consisted of one main/grand tour question and four follow on question aligned to the objectives of the study. Probing questions were asked during the interview in line with the theoretical framework guiding the study, literature reviewed, and the researchers experience with the topic under study. The probing questions were not predetermined, but depended on the response by the participant or the need for further clarity or more information. The guide included one final question aimed at addressing the last objective of the study which was to describe strategies that can be used to enhance correct use of SFH measurements to monitor foetal growth during pregnancy (Appendix 4).

4.8.2 Document analysis checklist

The researcher reviewed the selected maternity case records using a checklist that was developed by the researcher guided mainly by the literature review, selected DoH and WHO Guidelines, and the knowledge of the researcher as a practicing midwife on the expected practices of midwives in using SFH measurements to monitor foetal growth (Appendix 5). The DoH and WHO Guidelines that the researcher used to prepare the checklist were the Maternity Care Guidelines (South Africa, Department of Health 2016), and the Basic ANC handbook (USAID 2004). These two documents are in line with each other, and they offer guidance on how SFH should be measured, recorded and interpreted during ANC.

4.9 DATA COLLECTION PROCESS

Data collection was conducted in two phases. Phase one included interviews with midwives while phase two was retrospective document review. Where possible, the researcher collected

data till completion in one sub-district before moving to the next to allow separate monitoring of data saturation within each sub-district.

4.9.1 Phase1: Semi-structured interview with midwives

Data was collected using one-on-one semi structured interviews with the midwives who met the inclusion criteria and agreed to take part in the study.

According to Easwaramoorthy and Zarinpoush (2006) an interview is a conversation for gathering information conducted face-to-face or over the telephone where an interviewer coordinates the process of the conversation and asks questions, while an interviewee responds to those questions. Interviews are an appropriate method to collect in-depth information on people's opinions, thoughts, experiences, and feelings, and are useful when the topic of inquiry relates to issues that require complex questioning and considerable probing (Easwaramoorthy and Zarinpoush 2006). Of the three types of interviews that are used to gather data in qualitative research (structured, semi-structured and unstructured interviews), the researcher chose to use semi-structured interviews. DeJonckheere and Vaughn (2019) state that the purpose of semi-structured interviews is to gather information from key informants who have personal experiences, attitudes, perceptions, and beliefs related to the topic of interest. Having predetermined questions with a few additional probing questions allows the researcher to keep the discussion focused to the scope of the study while still allowing the participants an opportunity to provide rich information required for the study as they narrate their responses (DeJonhckheere and Vaughn 2019).

The researcher had planned that the interviews would be conducted by the researcher either face-to-face or via skype, depending on the choice of the participant and the COVID 19 lockdown restrictions in the country at the time of data collection. However at the time of data collection, COVID 19 pandemic was settling down and all participant opted for face-to-face interviews. The venue, date and time of the interview was negotiated with each participant. All interviews were conducted in English as the official communication language between health care workers in eThekwini district.

On the date of the interview, the researcher first confirmed the participant's willingness to proceed with the interview, that the consent form has been signed, collected the demographic information (Appendix 4), gave instructions regarding the process of the interview, assured

him/her of confidentiality and encouraged the participant to talk freely. The researcher advised the participant that the interview session would be recorded and that she would also be taking some field notes all of which would be used solely for the purpose of the study. The researcher requested verbal consent from the participant to audio record the session and to take some field notes. The researcher advised the participant of the anticipated duration of the study and that the session could be stopped at any point if the participants felt uncomfortable to proceed with the interview.

The researcher began the interview by pressing on the recording and pronouncing the allocated participant and clinic codes. From this point, the researcher refrained from calling the clinic or the participant's name in order to ensure confidentiality and anonymity. The researcher asked the first main question and proceeded with the interview till the end. The researcher allowed the participants to talk freely with minimal interruption to probe or redirect the participant as the need arose but continuously encouraged the participants to talk by remarks such as "Hmm, yes, I get you, ok, continue, tell me more, I am listening etc.". The researcher anticipated and advised at the onset of the interview that each interview session would last for 30-45 minutes. Therefore, ensured that each session did not last for more than 45 minutes. This was to safeguard against,1) boredom and exhaustion on the part of the participants and 2) to minimise disruption of the PHC clinic operation which could result if midwives were taken away from their work stations for long period of time.

At the end of the interview the researcher thanked the participant and stopped the recording. The researcher requested that they both listen to the recording so that the participant could confirm the accuracy of the recorded information. Where time did not allow or the participant preferred, the researcher summarised the interview based on the field notes and request the participant to confirm the accuracy of the information. The researcher bid the participant farewell and ended the interview thanking the participant for having participated in the study and assuring them of anonymity and confidentiality.

4.9.2 Phase 2: Document analysis

Document analysis was a retrospective review of maternity case records for the pregnant women who were attending ANC in the ANC clinics that were included in the study. Bowen (2009) attests that document analysis is often used in combination with other qualitative

research methods as a means of triangulation in the study of the same phenomenon and serves mostly as a complement to other research methods. In the current study the researcher used interviews with midwives together with document analysis to determine the practices of midwives in the use of SFH management to monitor foetal growth.

The researcher ensured that the normal operation of the clinic was not disturbed. The researcher tried to do both sampling and record review while the women were awaiting consultation with midwives. However, where time did not allow this, the researcher requested the women to allow her 10-15 minutes after ANC consultation to review the maternity case record. All the selected maternity case records were reviewed on the same day as the sampling. No records were taken away from the clinic. Keeping in mind that the maternity case record is a client held record, no women were made to leave their maternity case record behind. The process of document analysis is described under data analysis (Section 4.11.2).

Using the qualitative methodology for document analysis allowed the researcher to provide narratives regarding how the use of SFH to monitor foetal growth was evidenced in the maternity case records.

4.10 DATA MANAGEMENT AND STORAGE

Data was collected and stored in a manner that ensured that participants' confidentiality and anonymity were maintained throughout the research process the dissertation writing and publication process. During the interviews, the participants' personal details were neither audio recorded nor documented in the field notes. At the onset of the interview, a code assigned to each participant, the PHC clinic and the sub-district was pronounced to be audio recorded and written on the interview sheet used for field notes. Once the recording had started, the researcher ensured that the name of participant, PHC clinic and sub-district was not mentioned and also advised the participants to safeguard against this as much as possible. The collected data was kept in a safe, secure area for the research duration and is stored in a locked cupboard where it will be kept for five years since completion of the study. All electronic data has been secured with a secret code only known to the researcher. Immediately after all voice recorded data was transcribed and confirmed, it was removed from the audio recorder onto a disc and completely wiped off from the audio recorder. The disc is stored securely with all other hard

copies of research material in a locked cupboard. At the end of five years, the hard copies will be destroyed by shredding and the soft copies will be wiped off.

4.11 DATA ANALYSIS

According to Polit and Beck (2021) data analysis is defined as the systematic organisation and synthesis of research data. Thus, the purpose of data analysis is to organise, provide structure, and to elicit meaning from data (Polit and Beck, 2021). According to Creswell (2014), if implemented in the right manner, the steps can be used to reinforce what is currently believed, establish gaps in the published data, introduce a new way or looking at things, or even expand the current interpretation. In the current study data from the interview was thematically analysed while document analysis was content analysed.

4.11.1 Thematic analysis of data from interviews

Thematic analysis of data from the interviews was guided by the six steps as described by Creswell (2014) which included the following:

1. *Organising and preparing data for analysis*

During this first step the researcher was organized and prepared the data for analysis through transcribing interviews, optimally scanning material, and cataloguing each visual item, among others**.**

2. *Reading or looking at all the data*

The researcher read the transcribed data repeatedly to gain a general sense of the information and to secure the opportunity to reflect on its overall meaning.

3. *Coding the data*

The researcher organised the collected data by categorising the images and text and then labelling the categories with a term.

4. *Description of categories and themes for analysis*

The researcher utilised the coding process to come up with a description of the categories and or themes for analysis.

5. *Advance the manner in which themes and descriptions will be in the qualitative narrative*

The researcher advanced the manner in which themes and descriptions were in the qualitative narrative by using narrative passages to confer the outcomes of the analysis.

6. *Interpretation of the findings*

During this last but not least step, the researcher made an interpretation of the findings and asked herself about the lessons gained from the findings.

4.11.2 Content analysis of data from retrospective record review (document analysis)

Bowen (2009) describes document analysis as a systematic procedure for reviewing or evaluating documents through content analysis. The process includes finding, selecting, appraising and synthesising data contained in documents and yields data such as excerpts, quotations or entire passages that are then organised into major themes, categories, and case examples (Bowen 2009). The researcher in the current study analysed the maternity case records for evidence of the following information that is supposed to be documented by the midwife consulting with the client during ANC:

- Record of SFH measuring as evidence of the midwives doing FSH measurements as part of the assessment during ANC.
- Plotted SFH measurement onto the SFH graph provided in the maternity case record card.
- Interpretation as evidenced by written notes in the maternity case record.
- Drawing up of an action plan based on the findings of the FSH measurement as evidenced by written notes in the maternity case record card.

4.11.3 Data conversion or transformation

In addition to qualitative data analysis, data conversion/transformation was done for selected data components such as demographic characteristics and record review data. Polit and Beck (2021) refers to this process as quantitising qualitative data and describe it as the process of coding and analysing qualitative data. Quantifying/quantitising qualitative data allowed the researcher to do a deeper analysis of the phenomenon under study (Tashakkori and Teddlie 2009). The analysis only includes simple statistics such as totalling up of responses and

calculating percentages and averages. The findings from this analysis were presented in tables and graphs (see Chapter 5 for presentation of findings).

4.11.4 Data interpretation

In order to assist with interpretation of findings, the researcher on completion of data analysis triangulated selected of the analysis findings, particularly findings on the record review and also selected components within each data set where triangulation was deemed necessary and feasible such as evidence of plotting with evidence of interpretation. Triangulation is a process and/or outcome which involves the combination and comparison of multiple data sources, data collection and or analysis procedures, research methods and inferences that occurs at the end of the study (Tashakkori and Teddlie 2009).

4.12 RESEARCH RIGOR

Streubert and Carpenter (2011) define research rigor as a way to establish trust or confidence in the findings of a research study. The authors further state that research rigor is measured by how well the researcher has attended to the fundamental characteristics of the research method. It allows the researcher to establish consistency in the methods used over time and it provide accurate representation of the population studied. Grove, Burns and Gray (2013) concur stating that research rigour refers to openness, relevance, and thoroughness in data collection, data analysis process and the researcher's self-understanding.

In the current study research rigor was assured by ensuring trustworthiness of the study and the entire research process from data collection to analysis and reporting. According to Babbie and Mouton (2001), trustworthiness is the extent to which a research study is worth paying attention to, worth taking note of, and the extent to which others are convinced that the findings are to be trusted in qualitative research, Trustworthiness establishes research rigour without sacrificing relevance (Babbie and Mouton 2001). Lincoln and Guba (1985) state that the criteria of credibility, dependability, confirmability, and transferability for establishing the trustworthiness of a qualitative inquiry, later adding authenticity is a fifth criterion (Guba and Lincoln 1994). The researcher ensured adherence to all five criteria to ensure the trustworthiness of the study as detailed below.

4.12.1 Credibility

Credibility is described with the terms “authentic” and “accurate”. This means that the researcher asks him/herself whether the data and findings are suitable for his/her claims regarding the research and considers the number, depth, range of data and all what the researcher felt, heard, and viewed to have credibility during the study (Premises 2004 cited in Ghafouri and Ofoghi 2016). The researcher adhered to credibility by collection of raw data, taking field notes and use of audio recording during interview sessions. Member checking was done after interviews in order to check the validity of data interpretation with participants.

4.12.2 Dependability

Dependability is a criterion referring to the stability of data over time and over conditions. The researcher became transparent about methods used during data collection, analysis and interpretation of data collected, therefore ensuring that the consistency and reliability of the research findings is maintained. To enhance dependability, an audit trail was ensured by the researcher giving full description of all steps followed while conducting the study, which included participants signing an informed consent form, permission from the management and research committee, and audio recordings.

4.12.3 Confirmability

Confirmability is the degree to which the findings of the research can be confirmed by other researchers following the same steps as the current researcher (Korstjens and Moser 2018). The researcher described all the steps taken from the beginning of the research project, development and reporting of findings, all records of data collected from participants including transcribed interviews and field notes were kept throughout the study for evidence purposes.

4.12.4 Transferability

Polit and Beck (2021) define transferability as the extent to which qualitative findings can be extrapolated to other settings or groups, which is an aspect of trustworthiness. Thick descriptions were made whereby the researcher described the experiences, behaviour, and the context of the participants so that experience and behaviours become meaningful to other researchers and readers.

4.12.5 Authenticity

Authenticity refers to the extent to which qualitative researchers fairly and faithfully show the range of different realities in the collection, analysis, and interpretation of data (Polit and Beck 2021). The researcher made sure that the study had never been done before, and research questions had never been asked before. Research designs, methods and research questions were free from bias.

4.13 ETHICAL CONSIDERATIONS

Ethics are moral principles that are put in place by an individual or a group of people and are accepted as rules and behavioural expectations about correct conduct (De Vos et al 2005 cited by Munro 2011). The first step in ensuring ethical adherence was to obtain ethical clearance from the Durban University of Technology Institutional Research Committee (Appendices 1A and 1B) followed by requesting permission to collect data from relevant gatekeepers (Appendices 2A, 2B and 2C). The researcher informed all relevant leadership from eThekwini Municipality which included the sub-districts Deputy Heads of Health, the area managers, and the operational managers. In addition, the researcher informed all staff members in the selected PHC clinics to make sure that they are aware about the study. The researcher addressed all staff members in the selected PHC clinics to inform them about the study. Midwives who met the inclusion criteria were invited to voluntarily participate in the study. Information letters were issued to all prospective participants to afford the opportunity to read about the study at their leisure (Appendix 3A). The participants who agreed to take part in the study and the pregnant women who agree for their maternity case records to be reviewed were requested to provide written informed consent (Appendices 3B, 3C and 3D).

The three ethical principles as detailed by the South African DoH Ethics in Health Research (2015), namely, beneficence and non-maleficence, distributive justice (equality) and respect for persons (dignity and autonomy) were assured throughout the study as follows:

4.13.1 Beneficence

This is an ethical principle that seeks to maximise benefits for study participants and prevent harm (Polit and Beck 2021). Harm was prevented including physical, emotional, and psychological harm that may have affected participants of the study. A safe environment was

provided for the participants, consent to participate in the study was obtained, and during the interview sessions the researcher encouraged the participants to talk freely.

4.13.2 Distributive justice (equality)

This principle concerns the right to fair treatment and privacy (Polit and Beck 2021). Selection of participants was based on the requirements of the study, but all participants were treated equal irrespective of their culture, race, age and educational qualifications. The study participants were treated with respect and courtesy. The researcher informed the participants that information obtained during interview will be confidential and data will be kept in a safe lockable cupboard for safety purposes. Participants were allowed to decline to participate in the study without judgement.

4.13.3 Respect for person

In this principle, the researcher ensured that she treated all participants with dignity and respect. They were provided all the necessary information in order to take their decisions, for example participants were given information about the purpose of the study before they signed consent to participate in the study.

4.14 CHAPTER SUMMARY

Chapter 4 described the research methods and design. All steps and procedures that were adopted in conducting the study including procedures to ensure that a scientific inquiry was conducted were described in detail. The next chapter presents the findings from the study.

CHAPTER 5: PRESENTATION OF RESULTS

5.1 INTRODUCTION

Chapter 5 presents the findings from data analysis. Sample realisation, the findings on demographic characteristics of the midwives, the themes and subthemes derived from data analysis and on retrospective record review are presented. Selected findings such as demographic characteristics and some of the information from record review were quantified using simple statistics such as sums and percentages to allow interpretation. These are presented as tables and/or graphs under relevant sections.

5.2 CODING OF THE STUDY SITES AND PARTICIPANTS

All study sites and participants were allocated codes to ensure that confidentiality and anonymity is ensured during data collection and reporting. Codes were allocated as follows: Alphabets A-C were used to code the sub-districts, letters ‘P/A’ were used for the PHC/ANC clinics, the letter ‘M’ used for the midwives participants and the letter ‘R’ for maternity case records.

The sample of the study included ANC clinics that were run as specialist programmes/streams within the PHC clinics under the eThekwini Municipality administration. At the time of the study the norm was that one ANC clinic existed within each PHC clinic. Therefore, for the sake of this study, the PHC clinics and ANC clinics are going to be reported together and referred to as PHC/ANC clinics.

Because data saturation was monitored separately for each sub-district, numbering of each group was confined to each sub-district and each PHC clinic. The PHC clinics from each sub-district were grouped together and were allocated numbers from 1 to the total number of PHC/ANC clinics within that sub-district. Similarly the midwives and maternity case records from each PHC/ANC clinic were grouped together and were allocated numbers from 1 to the total number of participants within that PHC/ANC clinic. This grouping also ensured that the researcher complied with the predetermined minimum of four PHC/ANC clinics from each sub-

district and the maximum of two midwives and five maternity case records from each PHC/ANC clinic.

The code for each study participant (midwife and maternity case record) shows three characteristics as follows: 1) the sub-district, 2) the PHC/ANC clinic and 3) the group to which the participant belongs whether midwives or maternity case records. For example: **SC:P/A3:M2** represents midwife number two from PHC/ANC clinic number 3 from sub district C. Table 5.1 summarises how all codes were assigned.

Table 5.1: Coding of study participants

DATA ELEMENT	DESCRIPTION OF CODE ALLOCATION	EXAMPLE	INTERPRETATION
SINGLE CODES			
Sub-districts:	The three sub-districts were Coded as **S** and allocated alphabet A-C	SA	Sub-District A
PHC/ANC clinics	Coded as **P/A** and allocated numbers depending on number from each sub district	P/A2	Second PHC/ANC clinic
Midwives	Coded as **M** and allocated numbers depending on number in each PHC/ANC clinic	M1	Midwife no 1
Maternity case record	Coded as **R** and allocated numbers depending on number from each PHC/ANC clinic	R1	Maternity case record number 1
COMBINED CODES			
Sub-district/PHC/ANC clinic/midwife	The three single codes are combine to show the sub–district, the PHC/ANC clinic and the midwife	SA:P/A1:M1	Midwife number one from PHC/ANC clinic number 1 from sub district A
Sub-district/PHC clinic/maternity case record	The three single codes are combine to show the sub–district, the PHC/ANC clinic and the midwife	SA:P/A1:R1	Maternity case record number one from PHC/ANC number 1 from sub district A clinic number 1 from sub district A

5.3 SAMPLE REALISATION

Data was collected from the three sub-districts for the period of two months, from July to August 2022. The sample realisation for the entire study for each category of the participants were as follows: three sub-districts, 15 PHC/ANC clinics, 20 midwives and 60 maternity case records. As indicated in Figure 5.1 the highest number of PNC/ANC clinics (n = 6) were sampled in sub-district A and the least were in sub-district B (n = 4). Similarly, the highest number of midwives

(n = 8) were sampled in sub-district A however, the least were in sub-district C (n = 5). Sub-district C had the highest number of maternity case records sampled and again sub-district B had the least (n = 15) maternity case records. Figure 5.1 presents a graphical presentation of sample realisation for the entire study showing the total number of each participant group per sub-district.

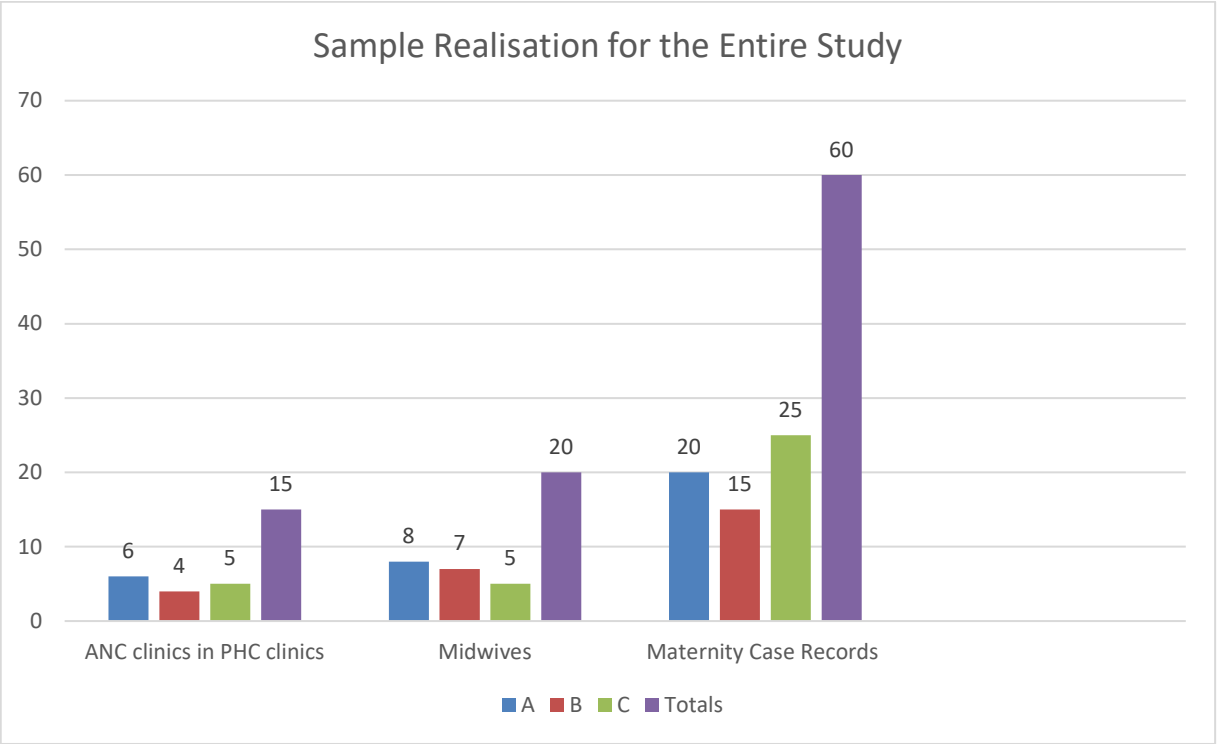

Figure 5.1: Graphical presentation of sample realisation for the entire study

5.3.1 PHC/ANC clinics

As specified in the methodology section, the researcher ensured a minimum of four PHC/ANC clinics were sampled per sub-district irrespective of data saturation. One additional PHC/ANC clinic was sampled from each sub-district from the data saturation point to confirm data saturation. Because data saturation was monitored differently for each sub-district, the number of PHC/ANC clinics included in the study varied per sub-district as reflected in Table 5.2. Thus, fifteen PHC/ANC clinics were included in the study whereby six were from Sub-district A, four from sub-district B and five from sub district C. Table 5.2 presents total number of PHC/ANC clinics included in the study per sub-district.

Table 5.2: Total number of PHC/ANC clinics included in the study per sub-district

Number of PHC/ANC Clinics	Sub- Districts			Total
	A	B	C	
Till data saturation	5	3	4	12
To confirm data saturation	1	1	1	3
Total	6	4	5	15

5.3.2 Phase one: Midwives

Sampling and data collection were done in two phases. During phase one sampling of midwives who met the inclusion criteria and with whom semi-structured interviews were conducted was done. A minimum of one and a maximum of two midwives were sampled per PHC/ANC clinic depending on their availability. In total twenty midwives were sampled and interviewed from the sampled PHCANC clinic, with eight from Sub-district A, seven from sub-district B and five from sub district C. One to two midwives were sampled from one PHC/ANC clinic in each sub-district from the point of data saturation to confirm data saturation. Table 5.3 presents total number of midwives included in the study.

Table 5.3: Total number of midwives included in the study.

Sub-districts	No of PHC /ANC clinics	Number of midwives		
		Till saturation	To confirm data saturation	Total
A	6	7	1	8
B	4	5	2	7
C	5	4	1	5
Total	15	16	4	20

5.3.3 Phase two: Maternity case records

Phase two included sampling of maternity case records that were retrospectively reviewed to determine the practices of the midwife in the use of SFH measurement to monitor foetal growth. A minimum of three and a maximum of five records were sampled and reviewed per PHC/ANC clinic. Sixty maternity case records were reviewed whereby twenty were from sub-district A, 15 from sub-district B and 25 from sub-district C. Five additional maternity records were sampled and reviewed from the point of data saturation from one additional PHC/ANC clinic in each sub-

district to confirm data saturation. Table 5.4 presents total number of maternity case records per sub-district.

Table 5.4: Total number of maternity case records per sub-district

Sub-Districts	No of PHC clinics	Maternity case records		
		Till saturation	**To confirm data saturation**	**Total**
A	6	15	5	20
B	4	10	5	15
C	5	20	5	25
Total	15	45	15	60

5.4 DEMOGRAPHIC DATA

Demographic characteristics were gathered for the midwife participants and included gender, age, ethnicity qualification and years of experience as a midwife. All twenty midwives included in the study were females. The majority of the midwives were above 35 years old (n = 18) and two were between 25 and 35 years old. With regards to ethnicity 18 midwives were black Africans and two were coloureds. Nineteen of the midwives had a basic midwifery qualification and one had an advanced midwife qualification. The demographic characteristics of the midwives are presented in Table 5.5

Table 5.5: Demographic characteristics of the study participants (n=20)

CHARACTERISTIC	1	2	3
Gender	Female = 20	Male = 0	Other = 0
Age group	< 25 years = 0	25-35 years = 2	> 35 years = 18
Ethnicity	African = 18	Colored = 2	Indian = 0
Qualification	Registered Midwives = 19	Advanced Midwife = 1	Staff Midwife = 0
Years of experience	< 5years = 0	> 5years = 20	

5.5 THEMES AND SUB-THEMES

Five themes emerged from the analysis of data gathered through semi-structured interview with midwives. These included:

- Knowledge regarding the use of SFH measurement to monitor foetal growth
- Attitudes of midwives
- Challenges within the workplace
- Motivating factors for the use of SFH measurement to monitor foetal growth
- Influences of past experiences

In addition, a number of sub-themes emerged related to each of the five themes. The themes and corresponding sub-themes are presented in Table 5.6.

Table 5.6: **Themes and sub-themes emerged from semi structured interviews**

THEMES	SUB- THEMES
Knowledge regarding the use of SFH measurement to monitor foetal growth	• Knowledge of practicing midwives regarding the importance of SFH, its indication and use • Non-alignment of basic midwifery training curriculum to practice • Lack of in-service training and workshops • Insufficient mentoring and peer support
Attitudes of midwives	• Importance of SFH measurement • Influences of institutional culture • Midwives' personal traits and habits
Challenges within the workplace	• Shortage of human and material resources • Time constraints • Heavy workloads • Too busy ANC clinics
Motivating factors for the use of SFH measurement to monitor foetal growth	• Institutional support and feedback, • Monitoring and evaluation processes • Staff training and skill development opportunities
Influences of the past experiences	• Negative experiences • Positive experiences • Rewards

5.5.1 THEME 1: Knowledge of practicing midwives regarding the use of SFH measurement to monitor foetal growth

Midwives are supposed to play a huge role in attaining reduction of maternal and neonatal mortality and morbidity rates by providing health care and early prevention of foetal abnormalities during pregnancy. Thus their knowledge regarding various activities that need to

be performed is crucial. SFH measurement is one of the tasks that needs to be performed by the midwives to monitor foetal growth and to detect abnormalities during pregnancy. The current study identified that the knowledge of midwives regarding the use of SFH measurement to monitor foetal growth in ANC clinics in eThekwini District had an influence on how this activity was performed. The participants who stated they were knowledgeable and clued up regarding this activity reported that they were able to use SFH to monitor foetal growth. This was evident in the following statements

> My clear understanding of how to use SFH is what has helped me to be able to use it to monitor foetal growth consistently and correctly. (SA: P/A2: M1)

> I for one I do not have a problem because I am clear regarding the use of SFH to monitor foetal growth, it does not take me very long to measure, plot, and interpret, and I always use my findings in drawing the plan of management for each client. (SB: P/A2: M1)

> The problem is when one lacks knowledge, otherwise, for us who are knowledgeable, we do not have any challenges with the use of SFH to monitor foetal growth. (SC: P/A3: M2)

The current study also identified gaps in the knowledge of some midwives regarding the use of symphysis fundal height measurement to monitor foetal growth in ANC clinics in eThekwini District. These gaps were grouped into four sub-themes as follows: 1) poor knowledge about importance of SFH and its indication and use, 2) non alignment of basic midwifery training curriculum to practice, 3) lack of in-service training and workshop opportunities and 4) insufficient mentoring and peer support. The findings on each of these four sub-themes are presented in the section below.

5.5.1.1 Sub-theme 1.1: Poor knowledge about importance of SFH measurement, its indication and use

It was evident from the study participants' comments that knowledge of the midwives regarding the importance of SFH measurement and its indication and use influenced their use of SFH measurements. This lack of knowledge resulted in them not always being compliant in the use of SFH measurement to monitor foetal growth. Some were either not using it at all while others were not using it as prescribed. The following statements from some of the participants are evidence of this:

I only started this month, and I am not yet confident about my skill more especial plotting of SFH graph, because I have been allocated in chronic stream (SC: P/A1: M1)

Previously I did not understand the importance of SFH measurement, so I will only measure and act on the finding if I get time, until we received complaints from referral institution and perinatal meetings about how poor foetal growth monitoring and management impact on pregnancy outcome. Now that I know, I always make sure that I do it accurately (SB: P/A3: M2)

There were times when the majority of us in this clinic didn't know how to use and interpreted the SFH graph and what was it for until we attended some training including BANC plus training then we started appreciating the importance and were able to do it correctly (SA: P/A3: M1)

5.5.1.2 Sub-theme 1.2: Non-alignment of basic midwifery training curriculum to practice

Midwives verbalised that they although they knew how to measure SFH, plotting and interpreting the graph was a challenge. They did not have enough knowledge about how to use the SFH graph and its importance because they never received this information during their basic midwifery training. The only midwives who had this skill were those who had received BANC training. The following excerpts from some of the participants are evidence of this:

Non-alignment of practice to the midwifery curriculum is the major concerns. Most of us never heard about this while we were on training. (SB: P/A2: M2)

I don't think I have enough skill to perform SFH because I haven't attended BANC training as yet, I only have basic knowledge from College and SFH measurement was never taught to us but we were taught how to estimate the foetal weight using palpation. (SC: P/A2: M1)

This is a new skill that was not taught to us during our time as student midwives. (SA: P/A2: M2)

5.5.1.3 Sub-theme 1.3 In-service training and workshops provided by an employer

The majority of the participants from all 3 sub-districts reported that they never had in-service training. The majority of the midwives who had attended the training revealed that it was fruitful, and it changed their attitudes towards the SFH graph because they started to understand the importance of the SFH graph and became interested. Nevertheless, a few participants stated that although they had had some in-service training on the use of SFH measurement to monitor foetal growth, the in-service training was not of much help because of the duration which was

very short and packed with other aspects of ANC. This did not allow them time to assimilate how to use SFH measurement to monitor foetal growth.

> I never use to plot SFH graph until I attended BANC plus training, one day I sent the patient to the hospital for. IUGR and the Dr phoned to confirm diagnosis, I was so excited and became confident. (SB: P/A2: M1)

> I only learnt about the use of SFH measurement to monitor foetal growth once when I attended the BANC training, but the course was very packed and I feel there should be annual updates or every six months refresher training in order to provide ongoing support and mentoring. (SC: P/A2: M1)

> We hardly get an opportunity to attend in-service training, all that we do is based on the skills that we got during basic training. (SB: P/A4: M1)

> Because the clinics are busy, even when there are opportunities to attend in-service training and workshops, very few of us get to attend and when they come back from the workshops they are unable to cascade the information to those who did not attend because time does not allow that, clinics are too busy to allow that. (SC: P/A2: M2)

5.5.1.4 Sub-theme 1.4: Mentoring and peer support

Midwives recommended peer mentoring and support as one of the strategies that had assisted them in improving their midwifery skills and to identify gaps and rectify them. One of the participants who is an ADM also confirmed that peer support assists them and that clinics that have advanced midwives are better off in this regard because the advanced midwives have better skills than basic midwives. This information was evident in the following statements from some of the participants:

> As an advanced midwife I conduct weekly in-service training in order to make sure that midwives understand how to interpret SFH graphs, and it helps, from the discussion with my colleagues from other clinics, having advanced midwives in the clinic is very much beneficial because they are able to mentor and support particularly the junior midwives (SB: P/A2: M1)

> Support received from experienced and senior staff members help us a lot. For an example, previously I did not understand an importance of SFH measurement until we received complaints from referral institution and perinatal meetings about poor foetal growth management, now we are receiving support from obstetrician, at least one visit per month, but unfortunately a few of us gets

this opportunity because there hardly any skilled personnel in the clinics such as advanced midwives in the clinics and obstetricians. (SB: P/A3: M1)

The problem is that senior midwives often lack knowledge and skills as well and thus they are unable to mentor and support junior staff, otherwise mentoring and support would really assist (SC: P/A1: M2)

5.5.2 THEME 2: Attitude of midwives

The participants attested that the attitude of midwives towards the use of SFH measurement to monitor foetal growth had a huge impact on the use of this monitoring strategy. The sub-themes related to the attitudes of participants included their acknowledgement of the importance of SFH measurement and monitoring foetal growth and reduction of perinatal deaths, prevailing influences of institutional culture that influences behaviour, and attitudes of midwives and personal traits and habits for selected midwives.

5.5.2.1 Sub-theme 2.1: Importance of SFH measurement

The participants indicated that failure to use SFH measurement to monitor foetal growth was mostly influenced by the fact that some of the midwives did not acknowledge the importance of SFH measurement to monitoring foetal growth and its influence on reduction of perinatal deaths. According to these participants, a number of midwives believed in other means of assessing foetal growth such as palpation, ultra sound scanning etc. rather than the SFH measurement. This was evident in the following statements by some participants:

For me, I do not see the value of the SFH measurement, I would rather refer the women for ultrasound scan or assessment by the doctor if I am in doubt with my palpation findings. (SA: P/A2: M2)

I do not really see how it is important, if you are sure that you have done the assessment properly and your findings on palpation corresponds with palpation. And nowadays we have more sophisticated and advanced technique to pick up deviations in foetal growth. Really! Why should we be stuck with these unreliable techniques? We need to move with the times and advances in technology, to me this is sheer waste of time with huge risk of inappropriate diagnosis. (SB: P/A4: M2)

However, other participants acknowledged the importance and value of using the SFH measurements to monitor foetal growth and declared that they were religiously doing it. The following were some of the statements by the participants to this effect:

> I routinely do SFH measurement because I believe it is an accurate screening tool used in pregnancy to identify abnormalities like IUGR, polyhydramnios, twin pregnancy and large for gestational age, If SFH measurement is not done correctly there will be mismanagement of the foetus that can lead to foetal death, so there is a value in doing it and it is important that we all do it otherwise it becomes ineffective if some of us are doing it and others do not. (SC: P/A3: M2)

> According to my opinion SFH is a good practise because it alarms or allow midwives to identify abnormalities thus I feel we should all do it religiously. (SA: P/A1: M2)

> We use SFH to determine gestational age if the patient is uncertain about her LNMP, it's supposed to be done on every visits whereby we measure SFH and use findings as gestational age. (SC: P/A2: M2)

5.5.2.2 Sub-theme 2.2: Influences of institutional culture

The culture that prevailed in different clinics had an influence on the use of SFH to monitor foetal growth. Where a positive culture prevailed in the institutions/clinics, the midwives were motivated by this to perform their duties including using SFH measurement to monitor foetal growth as expected. Realising that other colleagues were compliant in their performance motivated the others to do the same. Where everyone in the institution strived for quality in their performance other colleagues were motivated to follow suit. Also where midwives who had more skill and knowledge were making themselves available to assist support and mentor those with lesser skill, practices of midwives within the institution and the quality of their practices improved. This was confirmed in the following statements. However, where positive culture did not prevail an opposite existed in the clinics such as not doing what is expected because others are not doing it as well. Also, where the skilled midwives were not willing to mentor and assist those that were less killed, poor performance remained an ongoing challenge. The following statements by participants were evidence of this:

> What is encouraging is when we club together and do the right thing. (SC: P/A3: M1)

In my clinic, we always strive for quality in everything that we do. Our clinic is ever rated high so we all strive to do everything correctly, including the use of SFH measurement to monitor foetal growth. (SB: P/A3: M1)

It becomes a waste of time if a few of us are doing it and others do not, it does not serve the purpose. Which is why I have also decided not to do it. (SA: P/A3: M2)

It is a bit of a problem especially plotting and interpretation. But what is good is that we are there for each other and guide and assist each other, which helps a lot knowing that you have your colleagues on your side. (SC: P/A2: M2)

The problem is how our senior staff and mangers deal with us when they discovered that we did not do SFH measurement correctly, they scold and treat you as if you do not have brains, that is very demoralising and one resort to that it is better just to abandon it instead of being blamed for trying. (SA: P/A4: M1)

5.5.2.3 Sub-theme 2.3: Personal traits and habits

A number of the participants verbalised that their personal traits influenced what they do and how they do it. Some of the participants indicated that it was their nature that they comply with instruction and did as expected. Others indicated that their love and pride in their work and midwifery profession motivated them to do the right things including using SFH measurement to monitor foetal growth. These were some of the statements by the participants:

It is in my nature that I follow instruction. Where I am not sure I always fish for help. Even with the use of SFH measurement to monitor foetal growth, I had some challenges when I first worked in the ANC clinic but made sure that I get help from the others, I now do not have a problem. (SC: P/A1: M2)

Using SFH to monitor foetal growth is not very easy, a bit complex and requires skill and practice, but it is up to an individual to get help from others. One needs to be upfront with her shortfalls and weaknesses otherwise Doctors and experienced midwives are available to assist us. That is how I improved my skill using the SFH measurement to monitor foetal growth. (SB: P/A3: M1)

You know at work, people can be very mean, they will talk about you mock and ridicule you. If they know you do not know something, you become a laughing stock. I just keep quiet and just do not do anything that I am not sure about. It is safer that way because no one will know that I do not know. (SA: P/A2: M2)

5.5.3 THEME 3: Challenges within the workplace

Participants verbalised a number of challenges experienced in the PHC/ANC clinics which resulted in them failing to use SFH measurements to monitor foetal growth. Some of these included shortage of human and material resources, time constraints, heavy workloads, too busy ANC clinics and limited skill.

5.5.3.1 Sub-theme 3.1 Shortage of human and material resources

Participants reported that shortage of human and material resources impacted on their accurate and constant use of SFH to monitor foetal growth. Shortage of human resource resulted in them omitting some of the activities and procedures meant to be done on pregnant women during ANC in an attempt to make sure that they attended to all ANC clients present in the clinics. According to the participant taking short cards in the provision of ANC services was the only way they managed to survive as shortage of staff had been an ever growing challenge in the clinics. Another factor that was highlighted that contributed to shortage of human resources was shortage of skilled midwives. The participants verbalised that sometimes the midwives working in the ANC clinics did not have appropriate skills thus putting strain on the ones that are better skilled. The participants stated the following in this regard:

> I do not have a problem with measuring SFH for each and every woman, but the problem is with consistency in plotting SFH graph, sometimes I plot and sometimes I don't because our facility has shortage of midwives and we are forced to work fast otherwise the clients start complaining, so we are forced to skip some procedures to avoid spending a long time with one client. Measuring of SFH is one procedure that we usually skip and prioritise palpation and listening to the foetal heart. (SA: P/A4: M2)

> The main reason for not plotting is shortage of staff and we are overwhelmed by large number of patients we have to see in a short space of time, sometimes it's about 100 patients, both mothers and babies and you may find that there are only two midwives. (SC: P/A3: M1)

> Another problem is that not all of us are appropriately skilled and when working with someone who does not know some of the activities to be performed, it puts additional strain on the one person who is clear on what needs to be done each time you need to verify things for the other less skilled person or you are the only one who is able to do some procedures. (SB: P/A2: M1)

Another challenge verbalised by the study participants was shortage of material resources mostly maternity case records. Unavailability of original maternity case records resulted in the use of photocopied documents that were often altered during the process resulting in SFH graph being skewed or faint thus making accurate plotting and interpretation a challenge. In some clinics a simple tool like a tape measure would sometimes not be available or the tape measures being used were torn and worn out thus resulting in inaccurate readings, as is evident in the following excerpts:

> SFH measurement is done on every visit but sometimes I miss to plot when working alone trying to cover all the clients at the clinic. (SA: P/A2: M1)

> I do not have a problem with measuring SFH for each and every woman, but the problem is with consistency in plotting SFH graph, sometimes I plot and sometimes I don't because our facility has shortage of midwives and are forced to work fast otherwise the clients start complaining, so we are forced to skip some procedures to avoid spending a long time with one client. Measuring of SFH is one procedure that we usually skip and prioritise palpation and listening to the foetal heart. (SA: P/A4: M2)

> The main reason for not plotting is shortage of staff and we are overwhelmed by large number of patients we have to see in a short space of time, sometimes it's about 100 patients, both mothers and babies and you may find that there are only two midwives. (SB: P/A4: M1)

5.5.3.2 Sub-theme 3.2: Time constraints

Participants verbalised that time constraints was among the challenges that they faced which resulted in them not using the SFH measurement to monitor foetal growth. They stated that they understood the importance of measuring SFH plotting of SFH measurement on graphs, and interpreting and using the findings to plan and implement management of the pregnant women, but unfortunately time often does not allow for all this to happen. Either they do not do the measurement at all or they do not do it to the end, from measurement to using it to plan management.

While the number of patients versus the staff complement is a factor, another factor that impacts on this is that there are too many different documents (registers and checklists) that the midwives are expected to complete during ANC services provision which are all time consuming. This was stated as follows:

Sometimes I forget to plot SFH findings on the graph because there are so many checklists and registers that need to be completed for each patient and I am the only one allocated for antenatal, postnatal care and newborns. (SA: P/A2: M2)

Reason for not plotting SFH, I think it time with so many things to document, maybe you have to document on ART file, TB file and maternity case record. If there was enough time or fewer documents or enough staff, anyone of the three, there would not be inconsistent use of SFH measurement to monitor foetal growth. (SC: P/A1: M1)

One complete ANC consultation could take up to an hour or more, particularly if a women have some complications or problems such as TB or HIV. And often just one or two midwives are allocated in the ANC clinic with close to 100 clients. Image the clinic is meant to run for eight hours and as a midwife you are forced to work as fast as you can if you are to finish all the clients within the set eight hour. This becomes a marathon subject to many faults and missings. Time does not permit accuracy you are bound to omit a number of activities some intentionally others unintentionally and pray and hope nothing goes wrong for the mother and the baby. (SB: P/A1: M2)

5.5.3.3 Sub-theme 3.3: Heavy workload

Almost all the participants revealed that they are overloaded with lot of work due to large number of clients and shortage of staff. They reported the workloads at the clinics to be abnormally high. In some PHC/ANC clinics only one midwife was allocated to do all maternal and child care services such as ANC, postnatal care etc., irrespective of the number of clients presenting at the clinics. The one or two midwives would still be responsible for attending to clients presenting in labor or those with obstetric emergencies requiring to be stabilised prior to referral to the higher levels of care. This complaint of heavy workloads was evident in the following statements by some of the participants:

We are overwhelmed by large numbers of clients that we have to see in a short space of time. Sometimes it's about 100 clients with differing health needs, both mothers and babies and you may find that there are only two PNs. (SC: P/A1: M1)

I enjoy working in the ANC clinics, midwifery is my passion and I love doing everything as prescribed but sometimes it is not possible, you are forced to just go through what you think is more most important just to be sure that you have attended to all the women rather than some

having to go back home having not been seen. Yes, it is a huge risk but we have no choice but to take it, workloads are abnormally high in most clinics. (SA: P/A3: M2)

5.5.3.4 Too busy ANC clinics

The participants reported that the ANC clinics were too busy and are packed with clients every day. Over and above the staff patient ratios, the clinics were too busy due to disease patterns. Outbreaks of TB, HIV and COVID-19 pandemic had abnormally increased the workload, clients presented in the clinics requiring emergency care and consultation with these clients took longer time than expected for a normal ANC client thus making clinics too busy.

> What takes most of our time and makes the clinics to busy is attending to sick pregnant women some of whom come requiring emergency care. The queue of normal ANC clients comes to a stand still for one to two hours while you are attending to an emergency client before transfer. By the time you are back to continue with clients coming for routine ANC you are forced to skip some of the activities otherwise you will not finish. Even if you want to do everything you are forced to skip other things because by that time the clients are complaining of long waiting times. (SC: P/A4: M2)

> The way clinics are busy compels us to skip other things. (SA: P/A3: M2)

> Although management do not want to acknowledge this, the clinics are too busy and there is no way that midwives are able to do everything by the book. (SB: P/A1: M1)

> The solution will be to increase the number of staff, clinics are too busy and procedures like using SFH measurements to monitor foetal growth take time, you measuring, plotting comparing with the previous reading etc., all is time consuming, in a busy clinic it becomes impossible even if you want to do it and understand its importance. (SA: P/A2: M2)

5.5.4 THEME 4: Motivating factors for the use of symphysis fundal height measurement to monitor foetal growth

During interviews, participants verbalised that a number of factors within the institutions were motivating them to perform their duties well including the use of SFH to monitor foetal growth. However other participants highlighted factors that were demotivating them. The three sub-themes that emerged from this theme were institutional support and feedback, monitoring and evaluation processes, and staff training and development opportunities.

5.5.4.1 Sub-theme 4.1: Institutional support and feedback

The study participants presented differing views regarding institutional support and feedback. Some participants were satisfied with the institutional support that they were getting stating that a quality assurance team was always available to evaluate, guide and direct then in performing their duties and that in-service training sessions were organised to ensure that they were kept up to date with current trends. The participants in this group also flagged positive feedback that they were getting following audits and evaluation and also from performance reports. They stated that even in cases where they have under/poorly performed the feedback was usually very constructive. These issues about institutional support and feedback were highlighted as motivating factors that assisted the participants to work hard and strive for continuous improvement even during challenging moments. These participants highlighted other support measures available within and outside the clinics that motivated them to work hard. This was stated as follows by some of the participants:

> We are lucky that we have institutional support, the quality assuring team visit the clinics for audits and to offer us guidance and direction. We use audit findings to identify areas that need improvement. (SC: P/A3: M2)

> We work under difficult conditions particularly regarding shortage of staff and equipment and very busy and overcrowded clinics but at least we have good institutional support, the area and operational managers are always available to assist us to address some challenges and we also have the quality assurance team. Their support gives us energy to pull on even during difficult times. (SB: P/A1: M1)

> What encourages us to continue is the manner in which feedback is given about our performance. This is done in a very constructive way without naming and shaming. Even at perinatal meetings where adverse pregnancy outcomes are discussed some of which resulted from us failing to use SFH measurement properly to monitor foetal growth. The discussion in these meetings is usually around where everyone as a team went wrong and what needs to be improved to prevent recurrence. (SA: P/A1: M2)

> We receive friendly visits from doctors and managers from our referral institution. It assists us to improve our skill regarding foetal growth monitoring. (SB: P/A3: M1)

> In our institution we have functional quality improvement team that attends to clinic issues including antenatal related problems, identify gaps, gives feedback and rectify mistakes. (SC: P/A3: M2)

> We have a WhatsApp group whereby midwives and Doctors discusses antenatal related issues. If I am uncertain about something I send WhatsApp. Doctors and midwives from other facilities are always available to answer questions. (SC: P/A3: M1)

Other participants indicated that most often feedback was given to them in a negative and demoralising manner and that they were not getting enough institutional support particularly from operational, area, and sub-district managers. These participants' issues related to human and material resource challenges that were not attended to by management staff, minimal opportunities for staff development and in-service training sessions, and the blaming attitude of the managers in cases of adverse outcomes in the clinics.

> Sometimes how people treat you influences how you do things , you know our managers most of the time are very demotivating, they scold us like small children for just one honest mistake, may be you miss plotting the SFH on just one occasion and they pick that up during the audit. Wow! It becomes a war, the person will tell you about all the stillbirths and how you contribute to failure of achievement of the targets. (SB: P/A1: M2)

> We appreciate being corrected but the how becomes important, and management needs to understand that we are human and thus subject to making mistakes and appreciate the conditions under which we work which are also so stressful and putting us at high risk of making mistakes. Their lack of understanding makes us feel they do care and instill and I do not care attitude on us as well, you end up saying why stress yourself because no one will appreciate. (SA: P/A3: M2)

5.5.4.2 Sub-theme 4.2: Monitoring and evaluation processes

The participants concurred that monitoring and evaluation was the critical thing within the eThekwini Municipality Health unit. They all agree that monthly and quarterly reports written by each PHC clinics were used for monitoring and evaluation purposes. In addition, regular audits were done by the quality assurance team. All these strategies assisted to monitor progress and identify gaps in practice and are used to plan corrective interventions. According to the participants, this has helped identify PHC/ANC clinics that were not compliant in selected aspects including correct use of SFH measurement to monitor foetal growth. The following statements by the participants revealed this:

> I can say for now what has been assisting us in improving our practice in general including the use of SFH measurement to monitor foetal growth is the extent and quality of monitoring and evaluation strategies that exist in eThekwini Municipality. The internal strategies are supported by the district strategies such as perinatal meetings. (SB: P/A3: M2)

> I thank the monitoring and evaluation process within eThekwini Municipality for the progress that I have made in using the SFH measurement to monitor foetal growth. Through this process a gap was identified in the whole district and a training was made available to all staff. Today I am able use the SFH measurement to monitor foetal growth without any problem. (SC: P/A3: M2)

The participants also agreed that regular district perinatal meetings were worthwhile monitoring and evaluation strategies used for maternal and child care. In these meetings maternal and child deaths were discussed and also the meetings were used for teaching opportunities on identified gaps in practice.

> Previously I did not understand the importance of SFH measurement until we received complaints from referral institutions and perinatal meetings about poor foetal growth management. (SB: P/A3: M2)

> I feel that we need to attend perinatal meetings more often because it is an eye opener, it made me to understand an importance of foetal growth monitoring to prevent perinatal deaths. (SA: P/A3: M1)

5.5.4.3 Sub-theme 4.3: Staff training and development opportunities

The participants acknowledged that skills development is crucial for each and every personnel because then employees become productive in the workplace, and the employer realises the need to send personnel for training and workshops for their development. They verbalised that receiving training from the employer was beneficial. A number of participants indicated that it would help if more frequent in-service training sessions and workshops could be made available so that more staff would get opportunities to attend as they usually take turns to attend available in-service training and workshops.

> There were times where people didn’t know how to use SFH graph and what was it for until we attended trainings, for an example BANC plus training was one training programme that was very beneficial in this regard. (SA: P/A3: M1)

> I think I have enough skill to perform SFH measurement, but I do need to refresh my mind with new developments in this and also to get sense of what is critical because sometimes I tend to forget other things. (SC: P/A1: M1)

> I only attended BANC training once where SFH measurement was included, but I feel it is not enough, to give a person a clear understanding and skill. I feel it would help if we can have annual updates or every six months refresher training that will assist midwives to do things correctly, including SFH measurement and plotting of graph. (SB: P/A3: M2)

5.5.5 THEME 5: Past experiences

Past experiences with the use of SFH measurement to monitor foetal growth were stated by most participants as having an influence on how they performed this activity. The two sub-themes were positive and negative experiences. What was common was that both the positive and negative experiences had a positive influence on how the participants performed this activity.

5.5.5.1 Subtheme 5.1: Bad experiences

The participants who had received feedback regarding incorrect or failure to use SFH to monitor foetal growth stated that this experience motivated them to ensure that they were competent in using the SFH measurements. They took upon themselves to get skilled by finding training or a mentor.

> I had a very bad experience where a women that I had attended to during ANC had an intra-uterine death due to missed intra-uterine growth retardation that was not identified during ANC because SFH was not done during most ANC visits. I felt so guilty that I vowed that I will never miss doing SFH measurement to monitor foetal growth again. (SA: P/A1: M2)

> I used to feel so guilty when a case of stillbirth or early neonatal death was discussed in the perinatal meeting and was from our clinic, worse when it was a women that I had also attended to during ANC. This would to eat me up, until I decided to take it upon myself to be extra cautious when providing ANC, particularly with the use of SFH to monitor foetal growth. I also take it upon myself to emphasize the importance to other midwives and to mentor and support those who are not sure how to do this. (SB: P/A3: M2)

5.5.5.2 Sub theme 5.2: Good experiences

Similarly, participants who had positive experiences where their accurate use of SFH measurement saved a baby became extra motivated and continued to always strive for consistent and accurate use of SFH measurement to monitor foetal growth. The following are some of the statements by the participants in this regard:

> You know it makes you feel so good when you have done an assessment accurately and came out with a correct diagnosis. I can still remember the feeling that I had when after referring the woman to hospital, the doctor from the referral hospital confirmed I had made a correct diagnosis, it made me so proud of myself. I now use the SFH to monitor foetal growth with confidence because I know I am good at it. (SA: P/A3: M1)

> Our good practice in provision of ANC including the use of SFH management to monitor foetal growth as prescribed is what have kept our clinic on the mark as an ideal clinic, and this has kept us motivated to always strive to do the best in order to maintain the status. (SB: P/A2: M1)

5.5.5.3 Sub theme 5.3: Reward

The third sub-theme under this theme was reward. The participants who had received recognition or rewards for outstanding performance indicated that they were motivated to keep up the good practice and strive to perform even better in all aspects of their performance, including the use SFH to monitor foetal growth. Even those that did not receive the award as individuals but as the whole clinic or their section in the clinic did the same. With the latter group the drive to sustain and improve performance occurred on a larger scale because it becomes a group effort to strive for excellence with each members in the group pulling and supporting each other towards best performance.

> Accurate use of SFH measurement to monitor foetal growth is one of the critical practices that is checked during the audit. Our clinic is ever listed as the best clinic, we are always on the top best performing clinics. Thus as a group we always ensure that we give our best when providing services. (SC: P/A3: M2)

> In my life as a midwife, I have received numerous appreciations from women whose babies were saved after I had referred them to hospital for abnormal foetal growth which I had detected through the use of SFH measurement. I know this really works so I make sure that I use the technique to monitor foetal growth for all women without fail. (SB: P/A2: M1)

5.6 FINDINGS ON RETROSPECTIVE RECORD REVIEW

The inclusion criteria for maternity case records was for pregnant women who had attended for ANC care at least three times after 20 weeks gestation. This inclusion criterion was important because SFH measurement is done after 20 weeks gestation (South Africa, Department of Health 2016; USAID 2004), thus records for women who were less than 20 weeks gestation would not have the SFH recorded. Furthermore, selecting records for women who had attended more than three times assisted in verifying patterns of plotting and interpretation thereof.

The researcher had to check for other relevant information which was deemed relevant to understand the use of SFH to monitor foetal growth for each client. This information included 1) Gestational age at booking, 2) Current gestational age and 3) Number of visits since booking. The findings on quantitative analysis of this information revealed the following out of the 60 maternity case record reviewed:

Gestational age at booking: 17% (n = 10) of the documents revealed that at initial booking the women were less than 12 weeks pregnant, 68% (n = 41) were between 12 and 20 weeks pregnant, and 15% (n = 9) were more than 36 weeks pregnant at booking.

Current gestational age: 78% (n = 47) of the documents revealed that the women were between 24 and 36 weeks, and 22% (n = 13) were above 36 weeks pregnant.

Number of visits since booking: It was evident from record review that no women had had less than 2 visits since booking, 70% (n = 42) had 2 to 3 visits since booking and 30% (n = 18) had more than four visits since booking.

Number of visits after 24 weeks: 100% (n = 60) women had already had two to four visits after 20 weeks gestation

Table 5.7 presents a summary of findings regarding ANC booking and attendance.

Table 5.7: Summary of findings regarding ANC booking and attendance

Criteria	1	2		3	Total
Gestational age at booking	< 12 weeks	12-20 weeks		> 20 weeks	60 (100%)
	10 (17%)	41 (68%)		9 (15%)	
Current gestational age	< 24weeks	24-36 weeks		> 36weeks	

	0	47 (78%)		13 (22%)	60 (100%)
No of visits since booking	< 2=	2-4		> 4	60 (100%)
	0	42 (70%)		18 (30%)	
No of visits after 24 weeks	< 2 = 0	2-4		> 4	60 (100%)
	0	60 (100%)		0	

5.6.1 Evidence related to SFH measurement

The prescription by the Department of Health is that from 20 weeks gestational age onwards, all pregnant women with singleton pregnancies should have SFH measurement done at all ANC visits. The measurement should be done using a tape measure with centimetres, recorded onto the maternity case records as part of the consultation notes, plotted onto an SFH graph available in the maternity case record. This measurement must be interpreted by comparing the plot to the percentile lines on the SFH graph to ascertain whether the size of the foetus is within normal range, and comparing it with the previous recordings where these are available to ascertain if the foetus is growing well. Finally the findings on SFH measurement should be used to plan the management of the pregnant women.

Therefore, review of the maternity case records focused on whether there was evidence of the following in each maternity case record:

- Recording of SFH measurement in centimetres as part of consultation notes;
- Measurement plotted onto SFH graph;
- Evidence of SFH graph being interpreted (information appearing on consultation notes); and
- Evidence of interpretation included in the management plan.

Thus, the review established whether information was complete and correctly recorded and/or actioned.

With regards to whether the midwives were doing the SFH measurement, the findings from data analysis differed from PHC/ clinic to /ANC clinic with some clinics doing the measurement and others not doing it.

Of those that were measuring the SFH, some of the PHC/ANC clinics were doing and recording the measurement at every ANC visit (interpreted as complete) while others were not doing it at every visit (interpreted as incomplete). The same applied to plotting, interpretation, and inclusion of the findings in the management plan of the pregnant women.

In addition, the record review revealed that some of the PHC/ANC clinics who were doing SFH measurements and plotting the graph etc., were doing these correctly while others were doing these incorrectly.

To establish whether the measurements and recording were done correctly the researcher compared what was recorded onto maternity case records with what is meant to be done according to Department of Health Maternity Care Guidelines, and compared to her experience and skill as a midwife.

The deviations noted with regards to plotting included that the plotted information did not correspond to the recorded SFH measurement and/or gestational age.

The deviations with regards to interpretation were mostly based on the latest plot and interpreted the growth as normal because the plot was at or above the 50th percentile yet, if compared to the previous recording the curve was either flat or flattening which was suggestive of poor foetal growth.

The findings that revealed incorrect use of the SFH interpretation to plan management of the pregnant women included instances where the interpretation of the SFH graph revealed a deviation from normal growth yet the management plan did not show any consideration of this, or the management plan would be to review at the next visit yet the deviation warranted that the pregnant woman be referred straight away for further management.

An example of a completed record review checklist showing the findings on record review (Participant: SC: P/A3:R46) is included as Appendix 7.

To facilitate better understanding, the findings on record review were quantified and are presented in the section below and summarised in Table 5.8.

Table 5.8: Summary of findings on record review regarding use of SFH measurements

Information	Complete		Incomplete		Missing	Total Record
	Correct	Incorrect	Correct	Incorrect		

Measuring of SFH	41 (68%)	n/a	15 (25%)	n/a	4(7%)	60(100%)
Plotting of SFH	9 (15%)	8(13%)	14(23%)	9(15%)	20(33%)	60(100%)
Interpretation of SFH graph	18 (30%)	12(20%)	6(10%)	10(17%)	14(23%)	60(100%)
Findings used to plan management	8(13%)	6(10%)	8(13%)	12(20%)	26(43%)	60(100%)

5.6.1.1 SFH measurement done and recorded

The evidence of whether the SFH was measured or not was whether there was a recording in the consultation notes showing this measurement in centimetres, or not. Of the 60 maternity case records reviewed, 68% (n = 41) had evidence of the measurement completely recorded (recorded for all ANC visits after 20 weeks gestation), 25% (n = 15) had evidence of the measurement incompletely recorded (not recorded for all ANC visits after 20 weeks gestation), and 7% (n = 4) and no measurements recorded. Table 5.9 presents a summary of findings on whether SFH measurement was done and.

Table 5.9: Findings on record review regarding SFH measurement

Aspect	Completely Recorded	Incompletely Recorded	Missing	Total
SFH measurement	(68%; n = 41)	25%; n = 15)	(7%; n = 4)	(100% n = 60

5.6.1.2 SFH measurement plotted onto the SFH graph

For this criteria the assessment was whether the SFH measurement was plotted or not, correctly plotted or not and completely or incompletely plotted or not (plotted after each visit). Out of the 60 maternity case records reviewed, SFH measurement was completely plotted on 28% (n = 17) maternity case records, incompletely plotted on 38% (n = 23) and missing on 33% (n = 20).

Of the 28% (n = 17) maternity case records that had SFH completely plotted, 15% (n = 9) had the measurement correctly plotted and 13% (n = 8) had it incorrectly plotted. Of the 38% (n 23) that had the measurement incompletely plotted (23%) (n = 14) had the measurement correctly plotted and 15% (n = 9) had it incorrectly plotted. Thus in total out of the 60 maternity case records (completely and incompletely plotted) 38% (n = 23) had the SFH graph correctly plotted and 28% (n =1 7) had it incorrectly plotted. Table 5.10 presents the summary of findings on whether SFH measurement was plotted onto the SFH graph in the reviewed records.

Table 5.10: Findings on record review regarding plotting of SFH measurement onto SFH graph

Aspect	Completeness			Accuracy	
SFH measurement plotted	Complete	Incomplete	Missing	Correct	Incorrect
	28% (n = 17)	38% (n = 23)	33%(n = 20)	38% (n = 23)	28% (n = 17)

5.6.1.3 SFH graph interpreted

Similar to the plotting of the SFH graph, the review of interpretation focussed on whether the SFH graph was interpreted or not, interpreted correctly (plotted or not), and interpreted all the time it was plotted or not. The findings on record review revealed that out of the 60 maternity case records reviewed 50% (n = 30) had the SFH graph interpreted each time plotting was done, 27% (n = 16) interpretation was not done all the time, while for 23% (n = 14), interpretation was not done at all. In addition, out of the 60 maternity case records reviewed 40% (n = 24) records had the SFH graph correctly interpreted, and 37% (n = 22) had the SFH graph incorrectly interpreted. Table 5.11 presents a summary of findings on whether there was evidence in the reviewed maternity case records of plotting onto the SFH graph being interpreted.

Table 5.11: Findings on record review regarding interpretation of SFH graph

Aspect	Completeness			Accuracy	
SFH measurement interpreted	Complete	Incomplete	Missing	Correct	Incorrect
	(50%; n = 30)	(27%; n = 16)	(23%; n = 14)	(40%; n = 24)	(37%; n = 22)

5.6.1.4 Evidence of SFH graph interpretation included in the plan of management

Out of the 60 maternity case records reviewed, 23% (n = 14) showed that the SFH graph findings were included in the plan of management all the time (each time the SFH graph was plotted), 33% (n = 30) showed that the SFH graph findings were not included all the time, and 43% (n = 26) showed that the SFH graph findings were not included at all. In addition, 26% (n = 16) showed that the SFH graph findings were correctly included and 30% (n = 18) showed that the SFH graph findings were incorrectly included. Table 5.12 presents the summary of

findings on whether there was evidence in the reviewed maternity case records of SFH graph interpretation being included in the plan of the management.

Table 5.12: Findings on record review regarding evidence of SFH graph interpretation being included in the plan the management

Aspect	Completeness			Accuracy	
Interpretation included in the plan of management	**Complete**	**Incomplete**	**Missing**	**Correct**	**Incorrect**
	(23%; n = 14)	(33%; n = 30)	(43%; n = 26)	(26%; n = 16)	18(30%; n = 18)

5.7 TRIANGULATION OF FINDINGS

5.7.1 Triangulation of findings from the different aspects of the record review

The retrospective record review focused on four aspects of the SFH measurement process, namely, recording of SFH measurement in centimetres as part of consultation notes, plotting of SFH measurements onto the SFH graph, evidence of SFH graph being interpreted (information appearing on consultation notes) and evidence of interpretation used to plan the management. The findings on these were triangulated to double check if they were aligned to each other. What was common in the findings for these were the following:

- ***Correctly recorded.*** The majority of records showed that the SFH measurement was correctly recorded (68%; n = 41). The category which showed the lowest number of correctly recorded items was the interpreting the SFH graph findings in the management plan (23%; n = 14).
- ***Incorrectly recorded.*** The aspect with the highest number of incorrectly recorded items was SFH measurement plotted onto the SFH graph (38%; n = 23). The aspect which showed the lowest number of incorrectly recorded items was SFH measurement done and recorded (25%; n = 15).
- ***Found to be missing.*** The aspect with the highest number of missing items was that of including the SFH graph findings in the management plan (43%; n = 26). The aspect which showed the lowest number of missing items was SFH measurement done and recorded (7%; n = 4).

With regards to accuracy of the recordings, the aspect that was recorded correctly in the majority of records was interpretation of the SFH graph (40%; n = 24), and the lowest number

of correct recordings were for including the SFH graph finding in the management plan (26%; n = 16) records.

The aspect that was most commonly recorded incorrectly in the majority of records was interpretation of the SFH graph (37%; n = 22) and least commonly was plotting of SFH graph (27%; n = 17) records.

However, there were no huge variation between the number of records with correct and incorrect recording for plotting, interpretation and including the SFH graph findings in the plan of management. Correct was 38% (n= 22), 40% (n = 24) and 26% (n = 16) respectively, while incorrect was 28% (n = 17), 37% (n = 22) and 30% (n = 18 respectively. Table 5.13 presents a comparison of all four aspects showing the aspects that had the majority and those that had the least evidence on records compared to the others.

Table 5.13: Comparison between the four aspects regarding numbers

Analysis Findings	Majority	Findings	Least	Findings
Complete	SFH measurement done and recorded	(68%; n = 41)	Including the SFH graph findings in the management plan	(23%;n = 14)
Incomplete	SFH measurement plotted onto the SFH graph	(38%; n = 23)	SFH measurement done and recorded	(15 (25%)
Missing	Including the SFH graph findings in the management plan	(43%; n = 26)	SFH measurement done and recorded	(7%; n = 4)
Correct	Interpretation of the SFH graph	(40%;n = 24)	Including the SFH graph finding in the management plan	(26%;n = 16)
Incorrect	Interpretation of the SFH graph	(37%;n = 22)	Plotting of the SFH graph	(27%; n =17)

5.7.2 Triangulation of findings from interviews and record review

Triangulation of the findings from the interviews with midwives and the retrospective record review was done to check whether these findings corresponded to each other or not. The findings are presented in relation to the four aspects of the SFH measurement process:

- Recording of SFH measurement in centimetres as part of consultation notes;
- Plotting of SFH measurements onto the SFH graph;

- Evidence of SFH graph being interpreted (information appearing on consultation notes); and
- Evidence of interpretation included in the plan the management.

5.7.2.1 Recording of SFH measurement in centimetres as part of consultation notes

Some participants confirmed that they were measuring and recording SFH to monitor foetal growth, while some confirmed that they were not always measuring and recording the SFH, and others confirmed that they were not doing this at all. These findings from the interviews with midwives corresponds with findings on record review where out of the 60 records reviewed, 68% (n = 41) had evidence of the measurement completely recorded, 25% (n = 15) had evidence of the measurement incompletely recorded, and 7% (n = 4) had no record, i.e. this data was missing.

5.7.2.2 Plotting of SFH measurements onto the SFH graph

With regards to plotting of the SFH measurement on SFH graph, the participants verbalised that some of them were doing this all the time, others were not always consistent in plotting and others were not doing it at all. This again corresponded with the findings on retrospective record review where out of the 60 maternity case records reviewed, SFH measurement was completely plotted on 28% (n = 17), incompletely plotted on 38% (n = 23) and missing on 33% (n = 20).

While some the participants confirmed that they were competent in plotting the SFH graph and were doing this all the time, others indicated that they were not well skilled in this while others stated that they did not have time to do it due to shortage of staff and time constraints thus they were either plotting incorrectly or not plotting at all. Again these findings correspond to the record review findings whereby of the 60 maternity case records reviewed 23 (38%; n = 23) had the measurement correctly plotted and 28% n = 17) had it incorrectly plotted.

5.7.2.3 Evidence of SFH graph being interpreted (information appearing on consultation notes)

Some midwives indicated that they had challenges in interpreting the SFH graph either due to poor skill or unavailability of time to do so. Thus these were either not interpreting the SFH graph at all or they were interpreting incorrectly. Nevertheless there were a few midwives who confirmed that they were well skilled and therefore were interpreting all the time and doing this

correctly. The findings on record review revealed the same where out of the 60 maternity case records reviewed, (50%; n = 30) maternity records had the SFH graph interpreted each time plotting was done, for (27%; n = 16) maternity records interpretation of the SFH graph was not done all the time, while for (23%; n = 14) maternity case records interpretation was not done at all. In addition, out of the 60 maternity case records reviewed (40%; n = 24) records had the SFH graph correctly interpreted and 37% (n = 22) had the SFH graph incorrectly interpreted.

5.7.2.4 Evidence of SFH graph interpretation being included in the plan the management

Because the midwives had poor skills in plotting and interpreting the SFH graph, they both were either not plotting and interpreting, or they were doing these incorrectly. As a result they had challenges in including the interpretation of the findings in the plan the management of the pregnant women simply because the findings were not there or they were incorrect. The findings on retrospective record review concurred with these findings. Out of the 60 maternity case records reviewed 23% (n = 14) records showed that the SFH graph findings were included all the time (each time the SFH graph was plotted), 33% (n = 30) showed that the SFH graph findings were not included all the time, and 43% (n = 26) records showed that the SFH graph findings were not included at all. In addition, 26% (n = 16) of the SFH graph findings were correctly included and 30% (n = 18) of the SFH graph findings were incorrectly included.

5.8 CHAPTER SUMMARY

Chapter 5 presented the results of data analysis. Themes that emerged from data was presented in line with the objectives. Discussion of the study findings are presented in Chapter 6.

CHAPTER 6: DISCUSSION OF FINDINGS

6.1 INTRODUCTION

Chapter 6 presents the discussion of findings. The discussion is supported by relevant literature and focuses on the objectives of the study and the themes together with subthemes derived from the analysed data.

6.2 OVERVIEW OF THE RESEARCH DISCUSSION

The aim of the study was to explore and describe the participants' use of SFH measurement to monitor foetal growth in ANC clinics located within the PHC clinics under eThekwini Municipality administration in KZN. The four objectives explored in order to achieve the aim were: the current practices of the midwives in the use SFH management to monitor foetal growth during pregnancy in eThekwini District; the perspectives of midwives towards the use of SFH management to monitor foetal growth during pregnancy in eThekwini District; the challenges if any that are experienced by the midwives in the use of SFH management to monitor foetal growth during pregnancy in eThekwini District; and, how the correct use of SFH measurement to monitor foetal growth during pregnancy could be enhanced in eThekwini District.

The TPB was used as a theoretical framework to guide the study. The findings from the study are viewed against the three step process proposed by Ajzen proposed that people take to plan their behaviours, namely: an evaluation of whether a planned action is seen as positive, an evaluation to determine if there is a significant group of other people who would want to have the behaviour performed; and evaluation of the higher intention or motivation of the behaviour to determine if a positive personal outcome can be achieved. Furthermore, as proposed by Ajzen (1985), people have two types of beliefs, namely: normative and subjective, where normative beliefs are those that are independently developed and help to define a personal moral code, and subjective beliefs which are perceptions that can be influenced by the judgments or observations that others may provide. The researcher explored how beliefs of participants influenced their use of SFH in monitoring foetal growth.

Five themes and several subthemes emerged from the data analysis. The five themes were: knowledge regarding the use of SFH measurement to monitor foetal growth; attitudes of participants; challenges within the workplace; motivating factors for the use of SFH measurement to monitor foetal growth; and, influences of past experiences. As presented in the previous chapter, several sub-themes emerged under each theme

6.3 DISCUSSION OF FINDINGS BASED ON THE THEORY OF PLANNED BEHAVIOUR (TPB)

6.3.1 The three step process which people take to plan their behaviours

Ajzen proposed a three step process which people take to plan their behaviours. The three-step process involves an evaluation of an action to determine if 1) the behaviour would be seen as positive, 2) there is a significant group of other people who would want to have the behaviour performed and 3) if a positive personal outcome can be achieved. The findings of the study confirm that participants' use of SFH to monitor foetal growth has been influenced by a similar three step process.

This finding is supported by statements from participants indicating that they perceived SFH measurement as a positive behaviour since it is an accurate tool used to monitor foetal growth and it must be done on every visit to determine gestational age, identify foetal growth abnormalities and estimation of expected date of delivery. This was congruent with the findings from the retrospective review of maternity case records where SFH was recorded on clinical notes there was sometimes inconsistent plotting on the SFH graph. In most maternity case records it was found that woman may have three or more visits but the SFH graph was only plotted for one or two visits. This made it very difficult for another midwife to compare growth with the previous visits using the SFH graph. Sibiya, Cele and Ngxongo (2015: 58) further reported that if midwives do not complete information on the maternity case record card, this leads to poor communication.

Reviewed maternity case records from one facility in sub-district B revealed that SFH was done, documented, and interpreted after every visits and the plan of management was also aligned with an interpretation after each visit. This ANC clinic was managed by an advanced midwife which clearly showed that level of qualification also contributed to good performance. The behaviour of the participants was measured by their attitude towards SFH management based

on the fact that: (1) The majority of records reviewed reflected that SFH was measured and recorded on clinical notes; (2) There were some records that revealed inconsistent plotting of SFH graph; (3) Few records revealed full proper management of SFH, which includes measurement of SFH, plotting and interpretation of the SFH graph.

There were some factors articulated by the participants that negatively impacted their behaviour leading to negative perceptions. This included that some of the participants felt that plotting an SFH graph is time consuming because their ANC clinics are flooded with a large number of patients, there is a shortage of staff, and there is insufficient training .

Thus, the current study clearly shows that the majority of participants had a positive attitude and behaviour towards the use of SFH, but there were some negative influences which meant that some participants were less likely to perform SFH correctly. Those that had a positive attitude towards measurement, plotting and interpretation of SFH graph consequently performed well.

Participants acknowledged that doctors, managers, and the Department of Health requires them to perform SFH, and management supports them through training regarding antenatal related issues including SFH management, and some facilities receive friendly visits from obstetrics and gynaecology doctors. This motivates the participants and makes them realise that they have the skill and ability to perform SFH management properly. This indicates that support from management and doctors shaped the participants' behaviour and their intention to perform SFH as required by Department of Health. Vosloban (2012: 662) suggested that each manager must pay attention to employees' needs and provide them with the possibility of implementing their ideas and proving their abilities. Matthews *et al.* (2021: 160) concur that midwifery leaders in an organisation should prioritise strategies that focus on acknowledgment and support for midwives. According to Ngah *et al.* (2022: 1), employees' performance in terms of knowledge of job scope, safe working practices, and safety-related attitude at work, are used to measure an organisation's success.

Based on the attitude of participants and the support system from management, participants realised that they are capable, confident and have the desire to perform SFH as expected. They also believed that SFH management is beneficial to both mother and the unborn baby though they mentioned some challenges that inhibit them from engaging in this activity. The study

identified that the majority of participants had a positive attitude but poor intention to perform SFH while a few participants had a positive intention towards SFH management as a whole.

Participants pointed out some challenges that prevented them from performing well as outlined in Chapter 4, but the current study discovered that positive personal outcome (proper SFH management) was partially achieved by the majority of the participants but only a few participants achieved their personal outcome. This was measured by participants' behaviour and intentions towards SFH management. Ajzen (2015 cited by Leiva *et al.* 2020: 402) reported that several studies have used TPB to show that when the attitudes and subjective norms are more favourable and when there is greater perceived control, the person will be more likely to develop an entrepreneurial intention.

6.3.2 How the beliefs of participants influenced their use of SFH in monitoring foetal growth

According to Ajzen (1985) attitudes and beliefs impact the final decision that an individual makes toward the task at hand. Ajzen (1985) attests to that people have two types of beliefs: those that are independently developed and help to define a personal moral code and the perceptions (normative beliefs), and those that can be influenced by the judgments or observations that others may provide (subjective beliefs). Ajzen (1985) further reported that there are control beliefs and perceived behavioural controls within each belief system. The control beliefs are attitudes towards the behaviours (subjective norms) and may be real, perceived, or imaginary. In line with this, the current study identified that three behavioural beliefs influenced participants' use of SFH during foetal growth monitoring. Table 6.1 links the three behavioural beliefs identified by Ajzen (1985) to the themes that emerged from data analysis. How each of the three behavioural beliefs influenced the participants' use of SFH in monitoring foetal growth are discussed in the section below.

Table 6.1: Ajzen's theory (TPB) in relation to the major themes

Behavioural beliefs	Major themes
1. Attitudes towards the behaviour	• Attitudes of participants • Knowledge regarding the use of SFH measurement to monitor foetal growth • Challenges within the workplace
2. Subjective norms	• Motivating factors for the use of SFH measurement to monitor foetal growth
3. Perceived behavioural control	• Influences of past experiences

6.3.2.1 Behavioural beliefs towards the behaviour

Attitudes of participants

Attitudes towards behaviours impact the final decision that an individual makes regarding the task at hand (Ajzen 1985). Therefore, the attitude of midwives towards the use of SFH in monitoring foetal growth could impact their performance regarding this activity. This shows that attitude can play a huge role in shaping humans' behaviour.

Participants working in antenatal clinics demonstrated a positive attitude towards SFH measurement but a negative attitude towards plotting of SFH graph due to the challenges that they mentioned. They indicated and believed that SFH is an accurate screening tool that needs to be done on every antenatal visits to determine gestational age, identify foetal growth abnormalities and estimation of expected date of delivery. This was compatible with the findings obtained during the retrospective review of maternity case records whereby SFH in centimetres was found to be done and recorded in clinical notes on most visits, but sometimes to the results were not plotted on the SFH graph. This impacted negatively on their performance, considering that such an outcome did not serve the purpose of monitoring foetal growth through interpretation of SFH graph since there were gaps in the SFH graph. Miltenburg *et al.* (2017) indicated that SFH and weight measurement appeared to be done and documented more out of habit rather than as an instrument for clinical reasoning. According to Whelan *et al.* (2022: 12) accuracy of using SFH to estimate gestational age has long been debated, however SFH continues to be used in low middle income countries for gestational dating. The use of SFH charts with serial measurements plotted at every antenatal visit as part of the growth assessment protocol has been shown to increase the detection of SGA as this allows clinicians to see trends in growth. Miltenburg *et al.* (2021: 147) suggested that improvements in clinical performance are needed for SFH measurement to become clinically relevant.The current study revealed that participants had a positive attitude towards SFH, but the majority of participants mentioned some predisposing factors that impeded them from performing the desired behaviour which is proper foetal growth management through SFH.

Knowledge regarding the use of SFH measurement to monitor foetal growth

Leopold's manoeuvres and measurement of SFH were historically used to assess gestational age and foetal growth. These remain an important component of the physical exam in antenatal

care, especially in low-resource settings where ultrasound imaging is less available (Sparks *et al.* 2011, cited in Audette and Kingdom 2018: 121). According to Papageorghiou *et al.* (2016), SFH is simple, inexpensive, and easy to learn, and has the potential to identify the extremes of foetal growth disorders.

The majority of participants in the study knew the significance of SFH and its indications, and shared their past experiences regarding knowledge of SFH. The interviews revealed that some participants had poor knowledge regarding the use of SFH measurement. This was due to various reasons mentioned, including that participants were not properly trained on SFH so most of them were just using their knowledge from basic midwifery training. This could have led to misdiagnosing of foetal abnormalities like small for gestational age, intra uterine growth retardation, large for gestational age, twin pregnancies etc. The participants attested to this by indicating that they had received negative feedback from referral hospitals regarding poor foetal growth management. Some studies have proven that poor SFH measuring during antenatal care can cause misdiagnosis of foetal abnormalities. A study conducted by Nahian, Mohamed and Fraser (2021) found that despite attendance for antenatal care at a specialist facility, the diagnosis of SGA was often missed, with patient factors such as maternal BMI and clinician factors such as inconsistency in measurement of SFH contributing to misdiagnosis. Participants in the current study demonstrated an extensive knowledge regarding measurement of SFH practice, however there were a number of factors that hindered proper plotting of SFH graph during antenatal care. This included poor in-service training and negative peer reviews, lack of alignment of the basic midwifery curriculum to practice, and allocation of midwives in the facilities.

The study revealed that allocation of midwives was also a challenge, with most facilities using rotation of staff for allocation purposes. The participants indicated that sometimes they execute general nursing duties more than they practice midwifery duties, causing lack of skills and self-confidence when they are allocated back into antenatal clinics. This findings confirms findings by Matlala and Lumadi (2019) that the revision of the scope of practice and classification of midwifery profession away from general nursing by the South African Nursing Counsel (SANC) would place midwifery in its rightful status.

Insufficient training and workshops was identified as a problem during data analysis. Participants highlighted that there is a workshop called BANC training to which all municipal

clinics send their midwives to procure more knowledge about proper management of pregnant women. Those participants who have attended the training verbalised that it was very informative and caused them to realise that they knew little about the SFH graph. They have acquired confidence of the BANC training, but some of them feel just one training is insufficient because need ongoing training. Some participants reported that they have not attended any BANC training and that is the reason they are battling with plotting of the SFH graph.

One the participants who is an advanced midwife verbalised that she conducts in-service training for midwives pertaining to the SFH graph and interpretation, which was evident from the record review, with their records showing good performance – SFH was done and recorded on both clinical notes and SFH graphs, and interpretation was aligned with the SFH graph.

Challenges within the workplace

There were a number of factors that negatively influenced participants' use of SFH measurement to monitor foetal growth. These included shortage of human and material resources, insufficient training and workshops, not enough time, and work overload. The study revealed that participants were not receiving enough support from the employer. Participants reported that they were measuring SFH on every visit, but they encountered some challenges regarding plotting of the SFH graph. Consistent support and acknowledgement from the employer can assist an employees to improve their performances in the workplace.

The majority of the participants verbalised that the shortage of staff was one of the biggest challenges they are facing, and was found to be affecting the allocation of midwives in the facilities. Some participants felt that plotting the SFH graph is time consuming as they are overwhelmed with large number of patients in their facilities, and they complained about numerous checklists and documentation to be done for each patient. All these challenges identified have a negative impact on performance of the desired behaviour (SFH management). This is supported by Miltenburg *et al*. (2021: 147) who reported that poor SFH performance is caused by lack of time and space to ensure adequate history taking in an overloaded antenatal clinic where health providers often have several responsibilities simultaneously.

The study also revealed that midwife-to-patient ratios are a problem for patient care as midwives are overloaded with duties. This can lead to secondary problems like burnout. According to Ndaba (2013 cited by Mhlongo, Sibiya and Miya 2016: 5), high stress levels of

midwives emanate from poor support from management, lack of equipment and drugs, and high volume of patients in maternity units.

Ghafoor *et al.* (2021: 115) reports World health statistics showing that there are approximately 29 million nurses worldwide but an estimated one million more nurses are needed. Shortage of nursing professionals puts the whole profession at risk because nurses cannot give the best quality of care under such circumstances, and the image of the profession can suffer as a result. The authors further report that a shortage of nurses can increase medical errors, negligence and malpractice which then puts many lives in danger (Ghafoor *et al.* 2021: 115).

6.3.2.2 Subjective norms

Subjective norms can be described as the belief about whether most people accept or reject of a certain behaviour (Ajzen & Fishbein, 1980). Subjective norms relate to an individual`s beliefs about whether other important people such as family and friends approve or disapprove one's behaviour (Redda 2019:150).

Motivating factors for the use of SFH measurement to monitor foetal growth

According to 2016 maternity guidelines, midwives are expected to measure SFH on every visits. The measured SFH is plotted onto the 50th centile line on the SFH graph, allowing the corresponding gestational age to be read from the SFH graph. Participants knew that SFH is a requirement by the Department of Health and must be performed on every antenatal visits. Participants verbalised that even though they were performing SFH they had obstacles regarding plotting of the SFH graph, as outlined above.

The study identified some of the motivational factors that encouraged the participants to perform SFH, including perinatal meetings, support from O&G doctors, and BANC training. The participants indicated there are perinatal mortality cases that have been reported from a few facilities due to poor foetal growth management, but some of those facilities reported that they now receive support from O&G doctors from their referral institutions. This is done to support midwives by providing in-service education and training regarding antenatal related issues including SFH measurement, plotting and interpretation of the SFH graph. Increased support will minimise perinatal deaths. This finding is supported by Mirrezaei *et al.* (2018: 1) who reported that implementation of training programmes in an organisation can provide

organisational human resources with the proper knowledge in future and can assist their empowerment. Nudrat (2017: 54) concurs that training in any organisation makes their employees more aware of trends, challenges, problems, solutions and expectations related to their work.

Perinatal meetings have been identified as a monitoring and evaluating strategy used to minimise perinatal mortalities and morbidities. The participants verbalised that they normally attend perinatal meetings on a monthly basis. This is where doctors and midwives from different facilities present statistics for each month, discuss, and identify the contributing factors for each stillbirth, neonatal death and maternal death. Midwives are informed of any gaps so that then they can then develop a plan to address each and every gap identified. The participants indicated that perinatal meetings are beneficial to their clinical practice, and improve the quality of antenatal care. Maternal and perinatal death audit and review is widely recommended as an intervention to reduce maternal and perinatal mortality, and to improve quality of care, and could be key to attaining the SDGs (Willcox *et al*.2020:1)

Participants believe that doctors, managers, and the Department of Health requires them to perform SFH (normative beliefs), and that they are supported by them in this regard. This motivated participants. Due to support received from relevant structures, participants indicated that they are now confident about measuring SFH, plotting and interpretation of SFH graph, they are motivated to perform the desired behaviour, but still there is an inconsistency in the plotting of the SFH graph due to at the high number of patients, shortage of staff, and lack of time. Each participant was aware that they had to engage themselves in measuring and plotting the SFH graph, but many of them had obstacles leading to inconsistency in plotting of the SFH graph (subjective norm).

6.3.2.3 Perceived behavioural control

Perceived behavioural control, also referred to as self-efficacy, encompasses the extent to which an individual believes that they have control over performing of a behaviour. The TPB posits that a behaviour is directly determined by an individuals' intentions and perceived behavioural control, and is a measure of the confidence to perform the behaviour.

Influences of past experiences

Some of the participants indicated that previously they had some bad experiences regarding SFH measurement and plotting of the SFH graph. They verbalised that they did not even know what an indication of SFH graph was. Obese patients and twin pregnancies were reported as being challenges they were facing when measuring SFH. A study conducted by Nahian, Mohamed and Fraser (2021: 5) revealed that possible reasons for the inaccuracy of the measurement includes lack of clinical experience as it has been previously reported that less experienced professionals had less confidence in using a tape. The study identified that some participants had bad experiences due to lack of skills therefore they were not trained on BANC and that resulted in poor intentions towards plotting of SFH graph.

During data analysis it was discovered that participants who were BANC trained have skills to perform SFH measurement and to plot SFH graph and they are confident and capable of performing the desired behaviour (SFH measurement). Retrospective review of maternity case records revealed that SFH measurement was done on most visits but there was an inconsistency in the plotting of SFH graphs. Participants who had not received training were uncertain about their skills to perform SFH measurement. Rodriguez and Walters (2017: 206) revealed that research indicates that training and development can improve employee performance, although organisational leaders still experience gaps and challenges in this regard. The authors further reported that employee training and development is one of the most significant motivators used to help both individuals and organisations in achieving their short and long terms goals and objectives. Findings of the current study revealed that most participants were measuring SFH on every visit but were inconsistent in plotting the SFH graph and interpretation thereof. Participants had good intentions to perform SFH, but the challenges outlined above impeded the correct use of SFH measurement to monitor foetal growth by some of the participants.

6.4 DISCUSSION BASED ON THE FOUR STUDY OBJECTIVES

Four objectives were used to achieve the aim of this study, as follows:

- Explore the current practices of the midwives in the use SFH management to monitor foetal growth during pregnancy in eThekwini District.

- Determine the perspectives of midwives towards the use of SFH management to monitor foetal growth during pregnancy in eThekwini District.
- Explore the challenges if any that are experienced by the midwives in the use of SFH management to monitor foetal growth during pregnancy in eThekwini District and
- Describe how correct use of SFH measurements to monitor foetal growth during pregnancy could be enhanced in eThekwini District.

The discussion below points to the successful achievement of each of the four objectives.

6.4.1 Practices of the midwives in the use SFH measurement to monitor foetal growth during pregnancy

This study revealed that the majority of the participants were measuring SFH for each pregnant women on every visit using a tape measure from the symphysis pubis to the highest point of fundus, but not all of them then went on to use the SFH graph as a diagnostic tool to identify abnormalities even though they knew it was a requirement. A number of obstacles inhibited them from performing SFH measurements. This was clearly outlined by the majority the participants. Lawes and Jones (2020: 4) found that participants commented on the challenges in practising such an intrinsic skill such as SFH measurement on a simulated abdominal manikin. Nevertheless, a few participants were performing SFH measurement as expected. This was proved in the current study by the evidence obtained from review of maternity case records which looked for evidence that SFH was done and recorded on clinical notes and plotted on the SFH graph. Poor performance of SFH measurement was identified in the majority of files. Nevertheless, some midwives were performing it well with no obstacles reported. According to Basso *et al.* (2020: 1), SFH measurement is a simple method to assess foetal growth in relation to gestational age that can detect twin pregnancies, oligohydramnios, polyhydramnios, and other complications. The SFH should be measured and plotted onto SFH graph at all visits from 24 weeks onwards to screen for small for gestational age foetuses in particular (Moore and Fatouta 2021: 301). Nahian, Mohamed and Fraser (2021: 1) concurred that the rate of small for gestational age babies is low but can be improved with the introduction of a new programme of education and plotting of SFH on charts to assess the trend.

6.4.2 Perspectives of midwives towards the use of SFH measurement to monitor foetal growth during pregnancy

The findings from the study confirmed that most participants had positive perceptions regarding the use of SFH measurement which indicates that they perceived measuring SFH as a good behaviour. The study identified that there were factors that influenced participants' perceptions and attitudes regarding plotting of SFH graph. The majority of the participants verbalised that the SFH graph was time consuming since they had large number of pregnant women that they are serving in their ANC clinics. Matlala and Lumadi (2019: 1) reported that the shortage of midwives is directly related to poor provision of quality care because of an increased workload leading to low morale and burnout. Matlala and Lumadi (2019: 1) advised that management should recruit more staff who are midwifery trained. However, some of the participants did not report any challenges and they had only positive perceptions of SFH measurement. According to Carbon (2014: 1), the task of human perception is to amplify and strengthen sensory inputs to be able to perceive, orientate and act very quickly specifically and efficiently. Thus, both positive and negative perceptions towards SFH measurement were identified in this study.

6.4.3 Challenges experienced by the midwives in the use of SFH measurement to monitor foetal growth during pregnancy

Information shared by the majority of the participants revealed that there were a number of challenges related to plotting of the SFH graph. These included shortage of staff, insufficient training and workshops, in sufficient time, and work overload. These were highlighted as predisposing factors to poor performance of SFH management. This finding is supported the study conducted by Bremnes *et al.* (2018: 3), where midwives reported their challenges as being shortage of personnel, equipment and facilities that led to problem with overwork and the risk of infection for midwives. In their study Bremnes *et al.* (2018: 3) further reported that a substantially higher patient-nurse ratio had a negative impact on service provision. Similarly, almost all participants in the current study reported facing many challenges which affect their ability to provide quality maternal care. As stated by Uwamahoro *et al.* (2020: 1) all challenges reported by midwives in the current study could cause burnout that can lead to poor midwifery services. Nahian, Mohamed and Fraser (2021: 5) indicated that possible reasons for inaccuracy of the SFH measurement may include lack of clinical experience as it has been previously reported that less experienced professionals have less confidence performing SFH

measurement. Empirical evidence shows that when midwifery care is provided by educated, trained, and regulated licensed midwives, it is associated with improved quality of care, and rapid and sustainable reduction in maternal and new-born mortality (Koblinsky *et al.* 2006 cited by Adarata *et al.* 2021: 2). This shows that provision of sufficient/refresher training for midwives can improve quality ANC including SFH measurement. The participants in the current study reported that they were overwhelmed with the large number of pregnant women in a short space of time, leading to inconsistent plotting of the SFH graph. Bahadori *et al.* (2017: 9) suggested that measuring parameters such as waiting times in the wards of the clinic and the rate of nonattendance by patients who have previously taken a turn can be useful in identifying the level of overcrowding in the clinic. According to Egbujie *et al.* (2018: 311), implementation of the Ideal Clinic model in selected facilities led to changes in patient waiting time. The Ideal Clinic project is a South African project implemented by the Department of Health in July 2013 as a way of systematically improving and correcting shortages in the PHC facilities in the public sector (South Africa, Department of Health 2016: 10). According to this project, the average time that a patient should spend in the facility should be no longer that 3 hours (South Africa, Department of Health 2016: 10). The findings of the current study identified that reducing waiting time puts pressure on the midwives if there is a shortage of staff because they are then expected to provide antenatal care to many pregnant women within a shorter period of time. However, they also needed to balance between quality ANC and client satisfaction. Possible strategies to enhance correct use of SFH measurements to monitor foetal growth during pregnancy

There is research evidence that abnormal foetal growth significantly increases perinatal mortality rate (Wanyonyi and Mutiso 2018: 29). This creates the need to accurately monitor foetal growth in all pregnancies regardless of their risk status. Several methods used in clinical practice to monitor foetal growth include but are not limited to abdominal palpation, SFH measurement and obstetric ultrasound (Wanyonyi and Mutiso 2018: 29). According to these authors, correct use of SFH measurements can play a huge role in correct monitoring of foetal growth so as to achieve SDG 3 which aims to reduce neonatal mortality to at least as low as 12 deaths per 1 000 live births by 2030.

The current study identified several possible strategies to enhance correct use of SFH measurements to monitor foetal growth during pregnancy. Some of these are that SFH management can be enhanced by:

1) Sufficient staff training and development;
2) Monitoring and evaluation including quarterly audits and perinatal meetings;
3) Employ more staff and improve allocation of midwives at least two midwives per antenatal clinic; and
4) Improved booking system to prevent overcrowded antenatal clinic.

The study by Bremnes *et al.* (2018: 5) found that lack of opportunities for career advancement and personal development contributes to the feeling of demotivation of midwives. They further reported that continued education is one of the most effective ways to heighten midwives' motivation and cultivate their skills. Hildingsson *et al.* (2019: 2) attest that participation in ongoing education is of utmost importance in order to become a skilled and confident midwife. Though the participants in this study were trained midwives and the majority of them had attended BANC training, they all felt that continuous training would improve their knowledge regarding SFH measurement.

Perinatal audit was another strategy identified by the current study which can assist in enhancing the skills of midwives in the use of SFH to monitor foetal growth. Through perinatal audits, gaps in midwives' practices can be identified so that correctional measures can be instituted. Gutman *et al.* (2022: 684) stated that perinatal audits are essential to better understand the factors associated with perinatal deaths, to identify key deficiencies in healthcare provision, and should be utilised to improve the quality of perinatal care. Matlala (2017: 5) points out that the struggle in South Africa to improve maternal and perinatal outcomes means that this country is unlikely to achieve the 4th and 5th MDGs.

6.5 CHAPTER SUMMARY

This chapter discussed the results of the study in relation to relevant literature. All research questions have been answered. The next chapter presents the summary of findings, limitations, and recommendations of the study.

SUMMARY OF FINDINGS, CONCLUSIONS LIMITATIONS, AND RECOMMENDATIONS OF THE STUDY

6.6 INTRODUCTION

The previous chapter discussed the findings of the study supported by relevant literature. Chapter 7 is the final chapter and presents the summary of findings, conclusions, limitations and recommendations of the study.

6.7 OVERVIEW OF THE STUDY

A qualitative research design using descriptive research approach was used to conduct the study. Data was collected in two phases, namely, phase 1 which was semi-structured interviews conducted with 20 midwives working in municipal antenatal clinics in eThekwini District, and phase 2 which was retrospective review of maternity case records. The aim of the study was to explore and describe midwives' use of SFH measurement to monitor foetal growth in ANC clinics located within the PHC clinics under eThekwini Municipality administration in KZN. The current study focused on answering the following four research questions:

- What were the practices of midwives in eThekwini District regarding the use of SFH measurements to monitor foetal growth?
- What were the perspectives of midwives in eThekwini District towards the use of SFH measurement to monitor foetal growth?
- What challenges if any, were experienced by the midwives eThekwini District with the use of SFH measurement to monitor foetal growth?
- How could the correct use of SFH measurement to monitor foetal growth during pregnancy be enhanced in eThekwini District?

6.8 SUMMARY OF STUDY FINDINGS

The summary of findings shows achievement of the study objectives. At the beginning of the study four objectives were set to assist in achievement of the aim of the study. The section below summarises how each of the four objectives were achieved. Because the findings of the study have been presented in the previous chapter and supported with relevant literature, no further literature is referred to here.

6.8.1 Practices of midwives in eThekwini District regarding the use of SFH measurements to monitor foetal growth

In general, the practices of the participants differed from sub-district to district and from PHC/ANC clinic to PHC/ANC clinic for each aspect of SFH measurements regarding measuring, plotting, interpretation and using the findings in the plan of management. Both the participants and the findings of the record review concurred in that while some participants completed these tasks completely and correctly, others completed them incompletely and incorrectly or did not complete them at all.

The aspect that was done well compared to others was SFH measurement and recording as part of the consultation notes. The findings on the record review showed that this was done well compared to all the other aspect of SFH measurement. Out of the 60 maternity records reviewed, more than 68% of the records (n = 41) showed that SFH was measured and recorded consistently at every ANC visit. These findings were in line with the information from the interviews, the majority of whom confirmed that they were able to and were measuring and recording the SFH.

However, in a few records there was evidence of incorrect plotting, interpretation and use of SFH measurement findings in the management plan. Incorrect plotting was noted in 28% (n = 17) of records, incorrect interpretation noted in 37% (n = 22), and incorrect use of findings in the management plan in 30% n = 18) records. Participants also attested to this by verbalising that although sometimes they forgot to plot the SFH graph due to a number of factors, they were mostly plotting and interpreting the SFH graph and acknowledged the importance of SFH measurement, plotting and interpretation of SFH graph. This was especially the case for those who had attended BANC training.

It was evident from the comments of some participants that not all of them were able to use the SFH measurement to monitor foetal growth. A number of participants commented that plotting of the SFH graph, interpretation and the use of findings in the management plan were their major challenges. These participants stated that they lacked knowledge and skill in this regard because SFH measurement was not included in their basic midwifery training and there were insufficient in-service education and workshop opportunities on the use of SFH measurement to monitor foetal growth. This concurred with the findings on record review which revealed that

plotting of SFH was missing in 33% (n = 20) of the records, interpretation missing in 23% (n = 14), and the use of SFH measurement in the management plan management plan was missing in 43% (n = 26). A number of participants blamed their inability to use SFH to monitor foetal growth not on their lack of skill and knowledge, but on several other factors including overcrowded PNC/ANC clinics, time constraints and shortage of both material and human resources.

6.8.2 Perception of midwives in eThekwini District towards the use of SFH measurement to monitor foetal growth

It was evident from participants' comments that how they perceived the use of SFH measurement to monitor foetal growth had an influence on how they performed this activity. Those with positive perceptions appeared to try to do it in spite of all the challenges that they faced in the PHC/ANC clinics. Those with negative perceptions on the other hand, presented a lot of excuses regarding why they were unable to use SFH to monitor foetal growth. Some of them even discredited this method of monitoring foetal growth, stating that more accurate methodologies were available such as palpation and ultra sound scanning. Institutional culture also had some influence on participants' performance with participants tending to follow what others were doing whether good or bad.

6.8.3 Challenges experienced by the midwives with the use of SFH measurement to monitor foetal growth

It was evident from the study findings that several challenges prevailed in the PHC/ANC clinics. These impeded participants from performing SFH management as prescribed in the South African maternity care guidelines. The challenges included, though not limited to, shortage of human and material resources, insufficient training and workshops, time constraints, PNC/ANC clinics too busy, and work overload. The majority of the participants stated that they were working under pressure running overloaded ANC clinics, time was insufficient for them to attend to pregnant women presenting for ANC services and to complete multiple registered and checklists for each pregnant woman as required, which, according to the participants, were too many and often unnecessary. They highlighted that staff shortages caused them to work under pressure leading to poor performance as they rushed to complete all tasks including plotting and interpretation of the SFH graph. Thus in order to survive, they had to cut corners by omitting

some procedures including using SFH measurements to monitor foetal growth, particularly the plotting and interpretation of the SFH graph.

6.8.4 How correct use of SFH measurement to monitor foetal growth during pregnancy could be enhanced

Midwives interviewed outlined several strategies which could enhance the correct use of SFH measurement to monitor foetal growth during pregnancy. These included strengthening the quality of monthly reviews and audits, frequent in-service education and workshops for midwives, improved midwife to client ratios, adequate provision of material resources and constructive feedback to staff regarding their performance. Strengthening the quality of monthly peer reviews and audits would assist in identification of gaps and critical areas requiring strengthening. Frequent in-service education and workshops for midwives would assist in constant updating and uplifting the skill of midwives. Improved midwife to client ratios and adequate provision of human resources would assist with improving quality of services provided as midwives would have sufficient time to consult and examine each client. Constructive feedback would assist in working on solutions where gaps are identified instead of being a blaming mission that demoralises the midwives

6.9 LIMITATIONS OF THE STUDY

The study was conducted on a very small scale and with the study being qualitative in nature, the findings cannot be generalised to other similar settings.

Data collection did not include participant observation yet observing the midwives during ANC services provision could have improved the findings, particularly with regard to how SFH measurement was taken, recorded and plotted.

Data analysis did not include comparison between midwives from different sub-districts. This type of analysis could have identified one or more sub-districts with best practices which the sub-district that are struggling could use as benchmarks.

6.10 RECOMMENDATIONS OF THE STUDY

Recommendations are made in relation to policy formulation and implementation, service delivery, nursing education and research. These recommendations were derived from the

challenges experienced by participants regarding the use of SFH measurement to monitor foetal growth during antenatal care and includes strategies suggested by the participants that could enhance the use of SFH measurements to monitor foetal growth.

6.10.1 Policy formulation and implementation

The study identified that several problems were created by overloaded PHC/ANC clinics, staff shortages and insufficient resources. It is recommended that policy formulation and renewal should take cognisance of these so that clear policy directives are available to facilitate proper staffing and provision of material resources for all PHC/ANC clinics.

6.10.2 Service delivery

The study identified several challenges with regards to how feedback is given to staff which can end up demoralising staff rather than encouraging them, and how inappropriate skills influence service delivery particularly the use of SFH to monitor foetal growth. It is therefore recommended that managers and other relevant structures such as quality assurance teams should guard against negative criticism when providing feedback to staff.

Structured staff development programmes should be made available at various operational levels such as PHC/ANC clinic, sub-district, district and even provincial and national levels to facilitate opportunities for all staff members to engage in skills development, knowledge updates, and improvement.

6.10.3 Nursing education and training

The findings from the study confirm the misalignment between nursing education curriculum and practice. This was evidenced by the complaints by some participants about SFH measurement not being part of the basic midwifery training. Therefore it is recommended that nursing colleges work with service providers during curriculum development and renewal so as to ensure that the training curriculum is aligned with practice.

The study confirmed that there are insufficient in-service training and workshop opportunities. It is recommended that regular in-service training sessions and workshops be made available for staff in order to continuously improve their skills and to keep them abreast with new development such as the use of SFH measurements to monitor foetal growth.

6.10.4 Further research

A broader study involving more districts in KZN and where possible other provinces in South Africa is recommended so as to have a much broader sense of the extent of the problem of failure to use SFH to monitor foetal growth. It is also recommended that the study should include additional methods of data collection such as participant observation in order to gain a better sense of how and where the midwives are lacking in the use of SFH to monitor foetal growth.

6.11 CONCLUSION

Research shows that detection of foetal abnormalities during pregnancy is crucial because this facilitates timeous institution of appropriate interventions, thus reducing perinatal deaths and other untoward pregnancy outcomes from preventable causes. The study findings revealed that several situations prevailed where the use of SFH measurements was not done as expected. In most cases this emanated from several challenges experienced by the participants. A number of these challenges could be overcome with policy formulation and review as well as improved clinical practice during service delivery and/or aligning nursing education curriculum to clinical practice. Evidence of good practices from interview participants and record reviews support the researcher's conclusion that although gaps exists in the use of SFH measurements to monitor foetal growths, these gaps could be corrected by addressing all prevailing challenges.

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APPENDICES

Appendix 1A: Full Ethics Approval

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

10 June 2022

Ms L Z Dlamini
4261 Adams Mission
Umbumbulu Area

Dear Ms Dlamini

Midwives use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal.
Ethical Clearance Number: IREC 096/22

The Institutional Research Ethics Committee acknowledges receipt of your gatekeeper permission letter.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC Standard Operating Procedures (SOP's).

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Prof J K Adam
Chairperson: IREC

Appendix 1B: Provisional Ethics Approval

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

13 May 2022

Ms L Z Dlamini
4261 Adams Mission
Umbumbulu Area

Dear Ms Dlamini

Midwives use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal.

I am pleased to inform you that **PROVISIONAL APPROVAL** has been granted to your proposal subject to:

- Obtaining and submitting the necessary gatekeeper permission/s to Institutional Research Ethics Committee (IREC).

PLEASE NOTE THAT THIS IS NOT A FINAL APPROVAL LETTER. KINDLY SUBMIT THE ABOVE MENTIONED DOCUMENTS WITHIN THREE MONTHS TO THE IREC OFFICE. DATA COLLECTION CAN ONLY COMMENCE WHEN IREC ISSUES FULL APPROVAL

The Proposal has been allocated the following Ethical Clearance number **IRE 096/22**. Please use this number in all communication with this office.

Approval has been granted for a period of **ONE YEAR**, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Yours Sincerely

Prof J K Adam
Chairperson: IREC

Appendix 2A: Gatekeeper Permission request letter to the Head of Health

No. 4261 Adams mission
Umbumbulu area.
08 October 2021.

To: Ms Van Heerden
The Head of Health Unit
EThekwini municipality
9.Archie Gumede place
Durban
4000

RE: REQUEST FOR PERMISSION TO COLLECT DATA FROM ETHEKWINI MUNICIPALITY ANTENATAL CARE CLINICS (ANC)

Dear Mrs Van Heerden

My name is Ms Londiwe Zibuyile Dlamini a Master's in Nursing Degree student at the Durban University of Technology (DUT) in the Nursing Department, Faculty of Health Sciences. I hereby request your permission to collect data for my research project from eThekwini municipality ANC clinics.

Title of the study: Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal.

The nature of the study, which is qualitative, necessitated that the sample size be guided by data saturation. However, I wish to ensure a minimum of 12 ANC clinics irrespective of data saturation. The ANC clinics will gathered by sampling four clinics from each of the three sub-districts using a quota sampling method. This is scheduled as a first step after receipt of full ethics approval from DUT. A list of all sampled clinics will be communicated to you once sampling is completed. The study involves conducting individual semi structured interviews with midwives working in ANC clinics and retrospective record review of maternity case records for the pregnant women that will be attending ANC clinic at the time of data collection. A minimum of 6 ANC clinics will be included in the study (2 per sub-district), maximum of two midwives will be interviewed and maximum of five maternity case records will be reviewed per ANC clinic. The total number of ANC clinics, midwives and maternity case records for the entire study will be guided by data saturation.

I wish to guarantee you that I will ensure as minimal as possible disruption of the operations in the clinic by scheduling meetings for information sharing and data collection for the dates, times and venues that will best suit the clinics and study participants. These will be scheduled via the Managers of the clinics. I have provided you with a copy of my proposal which includes copies of the data collection tools letter of Information and consent to be used in the research process, as well as a copy of provisional ethics approval letter which I received from the Institutional Research Ethics Committee (IREC).The procedure from the institution is that full ethics is only granted after the researcher has received gate keeper permission from the data collection site. The full ethics letter will be forwarded to your office as soon as it becomes available.

I humble request your permission to use the eThekwini Municipality ANC clinics, Midwives and maternity case records for data collection.

If you require any further information, please do not hesitate to contact me.

Yours sincerely,

Londiwe Z. Dlamini Student Number: 21441940

Contact Details: Cell Phone 0767382869, email: 21441940@dut4life.ac.za

Appendix 2B: Approval letter eThekwini Municipality

ETHEKWINI MUNICIPALITY
Community & Emergency Services Cluster
Health Unit

9 Archie Gumede Place
Durban 4001
P O Box 2443
Durban 4000
Tel: (031) 311 3505
Fax: (031) 311 3710
Website:
http://www.durban.org.za

Ref. No. 30/1/1 / 6/3/1

To: Londiwe Dlamini

23 June 2022

Dear Researcher,

Subject: Approval of a Research Proposal

The Research Proposal Titled: **"Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal"** was reviewed by the eThekwini Municipal Health Department Research Committee. The study is hereby **approved to be conducted at eThekwini Municipal Clinics as per Annexure A** and is valid from **10 June 2022 until 09 June 2023.**

The following conditions need to be noted:

- Submission of the indemnity form obtainable from the eThekwini Municipality Health Unit before commencement of the study.
- Prior arrangements to be made with the facility and an assurance that clinic services will not be disrupted.
- No staff member should be used for collecting data for the researchers.
- **Progress reports to be provided and the final report of the study to the eThekwini Municipality Health Unit or emailed to: Bongi.Ntombela@durban.gov.za**
- Obtain permission from the eThekwini municipality health department for press releases and release of results to communities/stakeholders.
- The department has to receive recognition for the assistance given.
- Any amendment to the study must be communicated with the eThekwini Municipality Health Unit and the relevant amendment form obtainable from the unit to be submitted.
- Withdrawal of permission to conduct research will be left to the discretion of the eThekwini Municipality Health Unit.
- **Please take note of the duration of the study approval.**
- **An extension may be applied for if required. The Committee will review such a request and provide feedback accordingly.**

Yours sincerely

Mrs. Rose Van Heerden: Head of Health

ETHEKWINI MUNICIPALITY
HEALTH UNIT
TELEPHONE NO: 031 311 3505/6/8

Annexure A

Study	"Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal"
Clinics	1. Wyebank Clinic 2. Waterfall Clinic 3. Kloof Clinic 4. Westville Clinic 5. Luganda Clinic 6. Klaarwater Clinic 7. Nagina Clinic 8. Savannah Park Clinic 9. Mpola Clinic 10. Tshelimnyama Clinic 11. Mariannridge Clinic 12. Nazareth Clinic 13. New Germany Clinic 14. Pinetown Clinic 15. Queenburgh Clinic 16. Reservoir Hills Clinic 17. Chesterville Clinic 18. Shallcross Clinic 19. Township Centre Clinic 20. Woodhurst Clinic 21. Mzamo Clinic 22. Craigieburn Clinic 23. Umkomaas Clinic 24. Kingsburgh Clinic 25. Illovu Clinic 26. Amanzimtoti clinic 27. Adams Clinic 28. Athlone Part Clinic 29. Merebank Clinic 30. Bluff Clinic 31. Austerville Clinic 32. isipingo Clinic 33. Sydenham Clinic 34. Clare Estate Clinic 35. Cator Manor Clinic 36. Lancers Rd Clinic

ETHEKWINI MUNICIPALITY
HEALTH UNIT
TELEPHONE NO: 031-3113505/6/8

	37. Overport Clinic 38. Umlazi AA Clinic 39. Umlazi N Clinic 40. Umlzai G Clinic 41. Bayview Clinic 42. Lamontville Clinic 43.Redhill Clinic 44. Newlands West Clinic 45. La Lucia Clinic 46. Seacow Lake Clinic 47. Glen Earle Clinic 48. KwaMashu B Clinic 49. Bester Clinic 50. Inanda Seminary Clinic 51. Stonebridge Clinic 52. Ottawa Clinic 53. Caneside Clinic 54. Grove End Clinic 55. Waterloo Clinic 56. Redcliffe Clinic 57. Hambanathi Clinic 58. Trenance Park Clinic 59. Verulam Clinic

ETHEKWINI MUNICIPALITY
HEALTH UNIT
TELEPHONE NO:031-3113505/6/8

Appendix 2C: Letter of support eThekwini Municipality

ETHEKWINI MUNICIPALITY
Community & Emergency Services Cluster
Health Unit

9 Archie Gumede Place
Durban 4001
P O Box 2443
Durban 4000
Tel: (031) 311 3505
Fax: (031) 311 3710
Website:
http://www.durban.org.za

ETHEKWINI MUNICIPALITY
HEALTH UNIT
TELEPHONE NO: 031 311 3505

Ref. No. 30/1/1 / 6/3/1

To: Londiwe Dlamini

26 May 2022

Dear Researcher,

This letter serves to confirm that the Research Committee of the eThekwini Municipality Health Unit has received your proposed protocol titled: **"Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal"**

We have reviewed your protocol and are supportive of this study. We will however only be able to provide you with full gatekeeper approval once you have received ethical approval from your academic institution.

So, this letter will serve as a letter of acknowledgment of your study and a letter of support for your study. Full gatekeeper approval will follow once the ethical approval has been obtained.

Yours Sincerely

Mrs. Rose Van Heerden
Head: Health Unit

Appendix 2D: Indemnity form eThekwini Municipality Health Unit

Health Unit

ACKNOWLEDGEMENT OF RESEARCH CONDITIONS:

I LONDIWE DLAMINI undertake to comply to

EThekwini Municipality Health Unit's conditions for the study, as stipulated in the permission letter.

Name and signature of principal investigator:

Name: LONDIWE DLAMINI Signature: Date 04/07/2022

Name and signature of other researchers:

Name: _____ Signature: _____ Date: _____

Name: _____ Signature: _____ Date: _____

Name: _____ Signature: _____ Date: _____

Name: _____ Signature: _____ Date: _____

Appendix 3A: Participants Information Letter (Midwives)

LETTER OF INFORMATION

Title of the Research Study: Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal

Principal Investigator/s/researcher: Dlamini Londiwe Zibuyile.

Co-Investigator/s/supervisor/s: Prof.TSP Ngxongo

Brief Introduction and Purpose of the Study:

I wish to collect some information from you in your capacity as a midwife working in an ANC clinic regarding the Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal. My intention to conduct the study stem from my observation which is supported by research evidence that the increased number of perinatal deaths (stillbirths and neonatal deaths) is mostly attributed to failure to diagnose deviations in foetal growth and its resultant poor management of affected foetuses during pregnancy. Exploring the current practices of midwives in the use of symphysis-fundal height measurement to monitor foetal growth will assist in identifying good practices and gaps in this regard which I will consider to come out with recommendations from the study. The recommendations from the study if implemented could assist in facilitating improved use of this SFH measurement as monitoring strategy, facilitate accurate diagnoses and management of deviation of intrauterine growth during ANC with a possible outcome of curbing the ongoing problem of perinatal deaths.

Greeting: Greetings to you sir/madam.

Introduce yourself to the participant: My name is Londiwe Dlamini. I am a 2nd year student at DUT doing research for my Master's degree in Nursing in the Nursing Department, Faculty of Health Sciences.

Invitation to the potential participant: I would like to invite you to participate in my research project as per the information that I had with you in the information giving session today. I wish to have a one on one interview with you.

What is Research: Research is a process where some information is gathered about a certain subject. The information is collected from persons who know better about the subject in or are affected by that and is thereafter analysed to assist either in finding answers or to understand the subject in question better

Outline of the Procedures:

You are requested to participate in the study in the following manner:

- If you agree to take part in the study and sign an informed consent, I will conduct a one-on-one semi structured interview with yourself as a registered midwives working in ANC. The interview will take approximately 30 minutes and will be conducted in English during the date and time and at a venue that will be convenient and comfortable to you.
- Considering the status in the country with regards to the COVID 19 outbreak, all measures to safeguard you from the infection will be adhered to in line with the lockdown level at the time of data collection. All precautional measures will be discussed with you prior to the interview session and I as the researcher will be responsible for all cost implications in this regard.

- I will also request your permission to use an audio recorder and take some field notes in order to capture the information and also take field notes during interview session.

- I will also request some demographic information form you such as gender, race, age, years of experience etc. This information is critical for me to analyze and draw conclusions from the study. This information will exclude any personal information that might link you to the study such as name, surname, identity number or staff/work number.

Risks or Discomforts to the Participant: The study does not pause any physical or psychological risk to you as the participant in the study.

Explain to the participant the reasons he/she may be withdraw from the Study:
You will be allowed to voluntary withdraw from the study at any point if you choose to do so without any consequences to you.

Benefits:
The study is focusing on the midwives use of symphysis-fundal height measurement to monitor foetal growth. Findings of the study will be available in DUT library, copies will be available to the authorities of eThekwini municipality clinics, findings and recommendations from the study can also be used by policy makers to review current policies and/or formulate new policies related to the practice of midwives in the care of pregnant women at ANC level. After completion of the study, the researcher will obtain master's degree in nursing as a qualification.

Remuneration: You will not receive any form of remuneration for taking part in the study.

Costs of the Study: All the costs for the study are my responsibility as the researcher. No costs will be incurred by you as the study participant.

Confidentiality:

- As participants you are expected to fill in a consent form. The consent forms will be having your name but immediately after confirming that appropriateness of the consent, the researcher will store the signed consent forms in a sealed envelope in a very safe place under lock and key and separate to other data collection forms.

- For the rest of the research documents, I will make sure that you remain anonymous, no names or any other information that could identify or link you to the study will be used but just codes.

Results:
At the end of the research project, I will collate and prepare a bound copy of the dissertation. This will be available in the DUT website and also in your head office. You are free to access the copy. In an attempt to disseminate the research findings and recommendations, I also plan to write a papers for publication in accredited journals and to present findings in national and international conferences where opportunity avails.

Research-related Injury: The nature of the study does not pose any potential risk of injury to you as the participants.

Storage of all electronic and hard copies including tape recordings: All collected data will be kept in a safe, secure area for the research duration and will be stored in a locked cupboard. All electronic data will

be secured with a secret code only known to the researcher.

In line with the research and institutional policy, all data will be kept for five years on completion of the study after which hard copies (paper based) will be destroyed by shredding and soft copies (electronic) wiped off.

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

Researcher: Londiwe Z. Dlamini Tel: 0767382869 eMail: 21441940@dut4life.ac.za

Supervisor: Prof TSP. Ngxongo Tel: 0313732609 eMail: thembelihlen@dut.ac.za

Institutional Research Ethics administrator Tel: 0313732375

Complaints can be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

Appendix 3B: Participants Consent Form (Midwives)

CONSENT

Full Title of the Study: Exploring the Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal.

Names of Researcher/s: Dlamini Londiwe Zibuyile

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Londiwe Dlamini about the nature, conduct, benefits, and risks of this study - Research Ethics Clearance Number: Appendix 1.
- 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 / Right Thumbprint**

I, **Londiwe Dlamini** herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Londiwe Z. Dlamini	05/11/2021	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Appendix 3C: Modified Participants Consent Form for Pregnant Women (English)

NB: To be used for pregnant women whose maternity records cards will be included for retrospective record review during document analysis.

CONSENT

Full Title of the Study: Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal.

Names of Researcher/s: Dlamini Londiwe Zibuyile

Statement of Agreement to for personal maternity case record card to be included in the study:

 I hereby confirm that I have been informed by the researcher, Londiwe Dlamini about the nature, conduct, benefits, risks of this study and the need for her to use information from my maternity record card in 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 use of the information from my maternity record card in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared my maternity case record card be used in the study.
- I understand that significant new findings developed during the course of this research which may relate to the use of the information from my maternity case record cards will be made available to me.

Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**	

I, **Londiwe Dlamini** herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Londiwe Z. Dlamini	05/11/20	
Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Appendix 3D: Modified Participants Consent Form for Pregnant Women (IsiZulu)

Ifomu eliguquliwe lokuvumela ababambiqhaza (Abesifazane abakhulelwe)

NB: Lokusebenziswa abomama abakhulelwe abanamakhadi azosebenziselwa ucwaningo lokuhlolwa kwamarekhodi. (IsiZulu)

IMVUME

Isihloko esigcwele socwaningo: Midwives' use of symphysis fundal height measurement to monitor foetal growth in eThekwini District, KwaZulu-Natal.

Igama lomcwaningi: Dlamini Londiwe Zibuyile

Isivumelwano sokusebenzisa amakhadi abomama abakhulelwe kucwaningo:

- Ngiyaqinisekisa ukuthi ngichazeliwe umcwaningi, uLondiwe Dlamini mayelana nokuziphatha, ubungozi balolucwaningo kanye nokubaluleka kokutshenziswa kolwazi noma imibhalo esekhadini lami lokukhulelwa kulolucwaningo.
- Ngiyaqonda ukuthi ubulili, iminyaka, yokuzalwa kwami kanye nemininingwane ngokuxilongwa kwami kuzoba imfihlo kulolucwaningo.
- Ngokuqonda izidingo zocwaningo ngiyavuma ukuthi umcwaningi angashicilela ulwazi oluqoqiwe kwikhompyutha.
- Noma ngasiphi isigaba, ngivumelekile ukuhoxisa imvume yokusetshenziswa kwemininingwane yami etholakala ekhadini lami lokukhulelwa ngaphandle kokubandlululwa.
- Nginikiwe isikhathi esanele sokubuza imibuzo ngokukhululekan nokuzilungiselela ngokusetshenziswa kwekhadi lami kulolucwaningo.
- Ngiyaqonda ukuthi imiphumela yocwaningo ingahlanganisa nokusetshenziswa kolwazi oluzotholakala kwimininingwane esekhadini lami lokukhulelwa kanti nami ngizokwaziswa ngemiphumela.

Igama likamama lobambe iqhaza sesokudla	**Usuku**	**Isikhathi**	**Sayina/isithupha Thumbprint**

Mina, **Londiwe Dlamini** ngiyaqinisekisa ukuthi umama obambe iqhaza kucwaningo uchazeliwe ngemvelo, ukuziphatha nobungozi bocwaningo

Londiwe Z. Dlamini	05/11/2021	
Igama eligcwele lomcwaningi	**Usuku**	**Sayina**
Igama likafakazi (Uma ekhona)	**Usuku**	**Sayina**
Igama lomphathi wokomthetho (Uma ekhona)	**Usuku**	**Sayina**

Appendix 4: Data collection instrument for midwives

IDENTIFICATION INORMATION

NB: To be filled in by the researcher during the interview session

PHC clinic code: | | **Participant code:** | | **Date: .....**

DEMOGRAPHIC INFORMATION

NB: To be completed by the interviewee at the onset of the interview session

Please indicate with a tick (√) against the appropriate column for all the statements below

Gender

Male	
Female	
Other	

Age

<25	
25-35	
>35	

Ethnicity

African	
Coloured	
Indian	
White	

Qualifications

Registered midwife	
Advance midwife	

Years of experience as a midwife

<5years	
>5years	

INTERVIEW GUIDE

1. **GRAND TOUR QUESTION**

What has been your experience regarding the use of symphysis- fundal height (SFH) measurement?

2. **FOLLOW ON QUESTIONS**

a) What is the current practice in the ANC clinics regarding the use SFH measurement to monitor foetal growth?
b) How would you describe your knowledge regarding the use of SFH measurement to monitor foetal growth?
c) What are your perceptions regarding the use of SFH measurement to monitor foetal growth?
d) What challenges have you been experiencing with the use of SFH measurement to monitor foetal growth?

3. **FINAL QUESTION**

In your opinion what?

NB: a) *Only relevant probing questions from the list above will be asked to substantiate outstanding information not gathered from the interviewee or to clarify information provided in response to the grand-tour question.*

QUESTION	Participant Response	Probing Question/s	Participant Response
GRAND TOUR QUESTION			
What has been your experience regarding the use of symphysis-fundal height (SFH) measurement?			
FOLLOW ON QUESTIONS			
What is the current practice in the ANC clinics regarding the use SFH measurement to monitor foetal growth?			
How would you describe your knowledge regarding the use of SFH measurement to monitor foetal growth?			
What are your perceptions regarding the use of SFH measurement to monitor foetal growth?			
What challenges have you been experiencing with the use of SFH measurement to monitor foetal growth?			
FINAL QUESTION			
In your opinion, what strategies can be used to facilitate correct use of SFH to monitor foetal growth?			

Additional Notes

Appendix 5: CHECKLIST FOR DOCUMENT ANALYSIS

ANC clinic code: | | **Record Card No:** | | **Date: .....**

Particulars regarding the pregnancy and Clinic attendance

Gestational Age at booking	
Current Gestational age	
Number of Visits since booking	
Number of Visits after 24 weeks Gestation	
Gestational Age at booking	
Current Gestational age	
Number of Visits since booking	
Number of Visits after 24 weeks Gestation	

EVIDENCE RELATED TO SFH MEASUREMENT

EVIDENCE	Missing	Incomplete	Complete /incorrect	Complete /correct
Measuring of SFH				
Plotting of SFH				
Interpretation of SFH graph				
Action Plan				

NARRATIVE INFORMATION REGARDING EVIDENCE

Measuring of SFH: ……..
……
……
……

Plotting of SFH: ……
……
……
……

Action Plan: ……
……
……
……

Action Plan: ……

Appendix 6A: Sample of Transcript: Interview with Midwives

Appendix 5: DATA COLLECTION INSTRUMENT

IDENTIFICATION INORMATION

NB: To be filled in by the researcher during the interview session

PHC clinic code: SA: P/A2 **Participant code:** M1 **Date: .....**

DEMOGRAPHIC INFORMATION

NB: To be completed by the interviewee at the onset of the interview session

Please indicate with a tick (√) against the appropriate column for all the statements below

Gender

Male	
Female	**X**
Other	

Age

<25	
25-35	
>35	**X**

Ethnicity

African	
Coloured	**X**
Indian	
White	

Qualifications

Registered midwife	**X**
Advance midwife	

Years of experience as a midwife

<5years	**X**
>5years	

INTERVIEW GUIDE

4. GRAND TOUR QUESTION

What has been your experience regarding the use of symphysis- fundal height (SFH) measurement?

5. FOLLOW ON QUESTIONS

e) What is the current practice in the ANC clinics regarding the use SFH measurement to monitor foetal growth?

f) How would you describe your knowledge regarding the use of SFH measurement to monitor foetal growth?

g) What are your perceptions regarding the use of SFH measurement to monitor foetal growth?

h) What challenges have you been experiencing with the use of SFH measurement to monitor foetal growth?

6. FINAL QUESTION

In your opinion what?

NB: a) *Only relevant probing questions from the list above will be asked to substantiate outstanding information not gathered from the interviewee or to clarify information provided in response to the grand-tour question.*

QUESTION	Participant Response	Probing Question/s	Participant Response
GRAND TOUR QUESTION			
What has been your experience regarding the use of symphysis- fundal height (SFH) measurement?	'SFH measurement has been a good experience to me since I have worked in antenatal clinic, it helps me to determine if the foetus is growing well or not'	Ok, please me more about the use of SFH measurement?	Besides determining growth of the foetus, we also use SFH measurement to identify abnormalities like IUGR.
FOLLOW ON QUESTIONS			
What is the current practice in the ANC clinics regarding the use SFH measurement to monitor foetal growth?	'When providing antenatal services to our pregnant women we normal measure SFH on each antenatal visit'	Please tell me more about the process	'Yes, we plot findings on SFH graph but sometimes I miss to plot when working alone trying to cover all clients at the clinic'
How would you describe your knowledge regarding the use of SFH measurement to monitor foetal growth?	'My clear understanding of how to use SFH is what has helped me to be able to use to monitor foetal growth consistently and correctly'	You say 'consistently' please explain more on that	'Ok, I mean that I measure SFH on each antenatal visit and record on the clinical notes, but the problem is with plotting of SFH graph as I mentioned that sometimes I miss it on a busy days'
What are your perceptions regarding the use of SFH measurement to monitor foetal growth?	'I perceive SFH measurement as a good practice that needs to be done on every visit'	If not done on every visit, what happens?	'Misdiagnosis of the foetus if there are any abnormalities like intra uterine growth retardation (IUGR), incorrect gestational age if the mother is uncertain about LNMP'
What challenges have you been experiencing with the use of SFH measurement to monitor foetal growth?	'Too busy clinic resulting to work overload'	What other challenges besides that?	'Shortage of staff is also a challenge because I am the only one working in MCWH today, another midwife is on sick leave'
FINAL QUESTION			
In your opinion what strategies can be used to facilitate correct use of SFH to monitor foetal growth?	'By employing more midwives who are midwifery trained'	How can that assist you as midwives?	'This can reduce workload and allow midwives to have enough time to plot SFH graph and use it as a diagnostic tool'

Appendix 6b: Sample of Analysis Report: Midwife interview

PHC clinic code: SA: P/A2 **Participant code:** M1 **Date: .....**

QUESTION	Participant Response	Probing Question/s	Participant Response	Themes	Subthemes
GRAND TOUR QUESTION					
What has been your experience regarding the use of symphysis-fundal height (SFH) measurement?	'SFH measurement has been a good experience to me since I have worked in antenatal clinic, it helps me to determine if the foetus is growing well or not'	Ok, please me more about the use of SFH measurement?	Besides determining growth of the foetus, we also use SFH measurement to identify abnormalities like IUGR.	**Past experiences**	**Good experiences**
FOLLOW ON QUESTIONS					
What is the current practice in the ANC clinics regarding the use SFH measurement to monitor foetal growth?	'When providing antenatal services to our pregnant women we normal measure SFH on each antenatal visit'	Please tell e more about the process	'Yes, we plot findings on SFH graph but sometimes I miss to plot when working alone trying to cover all clients at the clinic'	**Challenges within workplace**	**Shortage of human and material resources**
How would you describe your knowledge regarding the use of SFH measurement to monitor foetal growth?	'My clear understanding of how to use SFH is what has helped me to be able to use to monitor foetal growth consistently and correctly'	You say 'consistently' please explain more on that	'Ok, I mean that I measure SFH on each antenatal visit and record on the clinical notes, but the problem is with plotting of SFH graph as I mentioned that sometimes I miss it on a busy days'	**Knowledge of practising midwives regarding the use of SFH measurement to monitor foetal growth**.	**Good experiences**
What are your perceptions regarding the use of SFH measurement to monitor foetal growth?	'I perceive SFH measurement as a good practice that needs to be done on every visit'	If not done on every visit, what happens?	'Misdiagnosis of the foetus if there are any abnormalities like intra uterine growth retardation (IUGR),	**Knowledge of midwives practices regarding the use of SFH measurement to monitor foetal growth**	**Importance of SFH**

			incorrect gestational age if the mother is uncertain about LNMP'		
What challenges have you been experiencing with the use of SFH measurement to monitor foetal growth?	'Too busy clinic resulting to work overload'	What other challenges besides that?	'Shortage of staff is also a challenge because I am the only one working in MCWH today, another midwife is on sick leave'	**Challenges within workplace**	**Shortage of human and material resources**
FINAL QUESTION					
In your opinion what strategies can be used to facilitate correct use of SFH to monitor foetal growth?	'By employing more midwives who are midwifery trained'	How can that assist you as midwives?	'This can reduce workload and allow midwives to have enough time to plot SFH graph and use it as a diagnostic tool'	**Challenges within workplace**	**Shortage of human and material resources**

Appendix 7: Sample of Completed Record Review Checklist

ANC clinic code: SA: [redacted] **Record Card No:** R3 **Date: .....**

Particulars regarding the pregnancy and Clinic attendance

Gestational Age at booking	14/40
Current Gestational age	38/40
Number of Visits since booking	7 Visits
Number of Visits after 24 weeks Gestation	5 visits
Number of Visits since booking	7 visits

EVIDENCE RELATED TO SFH MEASUREMENT

EVIDENCE	Missing	Incomplete	Complete /incorrect	Complete /correct
Measuring of SFH				✓
Plotting of SFH		✓		
Interpretation of SFH graph	✓			
Action Plan	✓			

NARRATIVE INFORMATION REGARDING EVIDENCE

Measuring of SFH:
Evidence of SFH measurement was documented on the clinical notes and SFH graph, Patient booked clinic at 14/40, SFH was done on the first day of booking until 38/40.

Plotting of SFH:
Inconsistent plotting of SFH graph identified on this record, SFH measurement was done from 14/40 until 38/40, but SFH is only plotted on 3 visits, therefore it was not easy to follow graph curve and to interpret SFH graph.

Action Plan:
No plan of management done based on interpretation of SFH graph**.**

Appendix 8: Editing Certificate

DR RICHARD STEELE
BA HDE MTech(Hom)
HOMEOPATH
Registration No. A07309 HM
Practice No. 0807524
Freelance academic editor
Associate member: Professional Editors' Guild, South Africa

154 Magenta Place
Morgan Bay
5292
Eastern Cape

082-928-6208
rsteele@vodamail.co.za

EDITING CERTIFICATE

Re: **Londiwe Zibuyile Dlamini**
DUT doctoral thesis: **MIDWIVES' USE OF SYMPHYSIS FUNDAL HEIGHT MEASUREMENT TO MONITOR FOETAL GROWTH IN ETHEKWINI DISTRICT, KWAZULU-NATAL**

I confirm that I have edited this thesis and the references for clarity and language. I returned the document to the author with track changes so correct implementation of the changes and clarifications requested in the text and references is the responsibility of the author. I am a freelance editor specialising in proofreading and editing academic documents. My original tertiary degree which I obtained at the University of Cape Town was a B.A. with English as a major and I went on to complete an H.D.E. (P.G.) Sec. with English as my teaching subject. I was a part-time lecturer in the Department of Homoeopathy at the Durban University of Technology for 13 years and supervised many master's degree dissertations during that period.

Dr Richard Steele
05 December 2022
per email