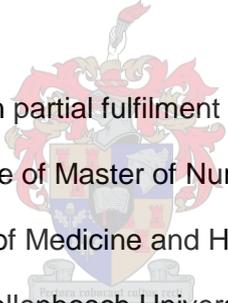


# **THE KNOWLEDGE OF BASIC NEONATAL RESUSCITATION AMONG MIDWIVES AT DISTRICT HOSPITALS**

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Thesis presented in partial fulfilment of the requirements  
for the degree of Master of Nursing Science  
in the Faculty of Medicine and Health Sciences  
Stellenbosch University

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**March 2017**

## DECLARATION

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# ABSTRACT

## Background

Globally there is an increase of neonatal deaths resulting in part from intra-partum asphyxia or hypoxia related to ineffective neonatal resuscitation at birth. Midwives can play a pivotal role in reducing neonatal deaths. The researcher was concerned about an increasing rate of early neonatal deaths, in the Chris Hani Health District, Eastern Cape. Consequently, a multi-pronged approach was put into place by the district, to address neonatal mortality by means of training midwives in basic neonatal resuscitation. The resulting question was whether the Chris Hani Health District midwives have the ability to conduct deliveries with the required knowledge in neonatal resuscitation, which could improve neonatal outcomes.

## Aim and objectives

The study aimed to determine the knowledge level of registered midwives with regards to basic neonatal resuscitation, in the Chris Hani Health District Hospitals in the Eastern Cape. The focus was on the identification of midwives' training, qualifications and experience in neonatal resuscitation; determining the knowledge of midwives on neonatal resuscitation at birth; and describing the relationships among the afore-mentioned.

## Methods

A quantitative approach with a descriptive correlational design was adopted. The sample included 110 registered midwives allocated in the maternity wards of the 13 district hospitals of the Chris Hani Health District.

A structured self-administered questionnaire was developed specifically to determine the extent of midwives knowledge with regards to the resuscitation of neonates at birth. Data was analysed with STATA (version 13) programme.

## Results

The knowledge score of the participants ranged from 63% to 97%, with a mean of 79% (SD 7.8). An acceptable knowledge level was 80% or more. Though there were no relationships found between midwives' training, qualifications and their knowledge; years of experience as a midwife were found to be associated with knowledge of basic neonatal resuscitation. Although the knowledge scores were high, some midwives did not have adequate knowledge on critical components of neonatal resuscitation.

## **Conclusion**

The study underpins knowledge in empowering midwives to carry out basic neonatal resuscitation. Recommendations of the study include a retention strategy for advanced midwives; equipping advanced and / or experienced midwives to train and mentor young midwives in the profession; and a review of the need for training of midwives on neonatal resuscitation and its impact on their knowledge.

These study findings and recommendations may strengthen the health systems that are in place to end preventable neonatal deaths; through imparting updated basic neonatal resuscitation knowledge to midwives.

## **Key words**

Knowledge, Basic Neonatal Resuscitation, Midwives, Neonatal Morbidity and Mortality, District Hospital.

# OPSOMMING

## Agtergrond

Daar is wêreldwyd 'n toename in neonatale sterftes, gedeeltelik as gevolg van intrapartum asfiksie of hipoksie wat met oneffektiewe resussitasie by geboorte verband hou. Vroedvroue kan 'n deurslaggewende rol in die vermindering van neonatale sterftes speel. Die navorser was besorg oor die toenemende aantal vroeë neonatale sterftes in die Chris Hani Gesondheidsdistrik in die Oos-Kaap. Gevolglik is 'n multi-ledige benadering deur die distrik in plek gestel om die neonatale sterftes by wyse van die opleiding van vroedvroue in basiese neonatale resussitasie aan te spreek. Die vraag wat hieruit voortvloei, is of vroedvroue van die Chris Hani Gesondheidsdistrik die nodige kennis in neonatale resussitasie het om verlossings te kan doen wat neonatale uitkomst sal verbeter.

## Doel en doelstellings

Die doel van die studie was om die kennisvlak van geregistreerde vroedvroue aangaande basiese neonatale resussitasie in die hospitale van die Chris Hani Gesondheidsdistrik in die Oos-Kaap te bepaal. Die fokus was op die identifisering van vroedvroue se opleiding, kwalifikasies en ervaring in neonatale resussitasie; die bepaling van vroedvroue se kennis aangaande neonatale resussitasie met geboorte; en om die verband tussen bogenoemde te beskryf.

## Metode

'n Kwantitatiewe, korrelasionele en beskrywende benadering was gevolg. Die steekproef het 110 geregistreerde vroedvroue geallokeer in die kraamsale van die dertien hospitale van die Chris Hani Gesondheidsdistrik ingesluit.

'n Gestruktureerde self-gedadministreerde vraelys is spesifiek ontwikkel om die omvang van vroedvroue se kennis ten opsigte van die resussitasie van neonate by geboorte te bepaal. Data is met die STATA (weergawe 13) program geanaliseer.

## Resultate

Die deelnemers se kennisvlak was tussen 63% en 97%, met 'n gemiddelde kennisvlak van 79% (SD 7.8). 'n Aanvaarbare kennisvlak was 80% of meer. Hoewel daar geen verhoudings gevind is tussen vroedvroue se opleiding, kwalifikasies en hul kennis nie; is gevind dat jare van ondervinding as 'n vroedvrou verband hou met kennis van basiese neonatale

resussitasie. Alhoewel tellings vir kennis hoog was, het sommige vroedvroue nie die nodige kennis aangaande sekere kritiese komponente van neonatale resussitasie gehad nie.

### **Slotsom**

Die studie rugsteun kennis ter bemagtiging van vroedvroue om basiese neonatale resussitasie uit te voer. Aanbevelings van die studie sluit in 'n retensie-strategie vir gevorderde en/of ervare vroedvroue; hierdie kaders behoort toegerus te word om ander vroedvroue en die vroedvroue met minder ervaring te mentor in die beroep op te lei; en 'n oorsig van die behoefte vir die opleiding van vroedvroue oor neonatale resussitasie en die impak daarvan op hulle kennis.

Die studie se bevindings en aanbevelings mag die gesondheidsisteme wat in plek is om die voorkombare neonatale sterftes te rugsteun, versterk deur opgedateerde basiese neonatale resussitasie kennis aan vroedvroue oor te dra.

### **Sleutelwoorde**

Kennis, Basiese Neonatale Resussitasie, Vroedvroue, Neonatale Morbiditeit en Sterfte, Distrikshospitaal

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## ABBREVIATIONS

DCST	District Clinical Specialist Team
DHIS	District Health Information System
EOST	Emergency Obstetric Simulation Training
ESMOE	Essential Steps in Management of Obstetric Emergencies
HBB	Helping Babies Breathe
MDG's	Millennium Development Goals
NDoH	National Department of Health
NMR	Neonatal Mortality Rate
SDG's	Sustainable Development Goals
WHO	World Health Organisation

# CHAPTER 1:

## FOUNDATION OF THE STUDY

### 1.1 INTRODUCTION

In 2013, there were approximately three million neonatal deaths worldwide; the majority were reported in low- and middle-income countries, which accounts for a growing proportion of under-five mortality (Assembly, 2015:2). Intrapartum or birth asphyxia is one of the main causes of neonatal deaths accounting for approximately one-third of early neonatal deaths (Lawn, Kinney, Lee, Chopra, Donnay, Paul & Darmstadt, 2009:S123–S142).

Global studies show that there is an increase in neonatal deaths worldwide, resulting from intrapartum asphyxia / hypoxia (Murila, Obimbo & Musuke, 2012:11-28). This increase may be related to a lack of knowledge in neonatal resuscitation at birth (Monebenimp, Tenefopa, Koh & Kago, 2012:25).

There is a significant occurrence of neonatal deaths in South Asia and sub-Saharan Africa (Baiden, Hodgson, Adjuik, Adongo, Ayaga & Binka, 2006:532). Pattison (2013:17) indicates that the majority of neonatal deaths occur in sub-Saharan Africa, thus accounting for about a quarter of all deaths in children between one and three months of life (Opondo, Ntoburi, Wagai, Wafula, Wasunna, Were, Wamae, Migiro, Irimu & English, 2009:1165-72). This could partly be as a result of poor infrastructure due to a lack of material, such as resuscitation equipment and personnel capacity in terms of qualification and experience (Baiden *et al.*, 2006:532).

The turn-around target for the attainment of the Millennium Development Goals (MDG's) was 2015. The review of the work done in many developing countries established that some of the goals were not achieved, including those dealing with neonatal and child health (United Nations, 2015:32). Recently the United Nations set new goals, namely the Sustainable Developmental Goals (SDG's). SDG three is to ensure healthy lives and promote well-being for all at all ages. Specific targets related to infant and child mortality are to reduce neonatal mortality to at least as low as 12 per 1 000 live births and under-five mortality to at least as low as 25 per 1 000 live births by 2030. Despite determined global progress, an increasing proportion of child deaths are in sub-Saharan Africa and Southern Asia. Four out of every five deaths of children under age five occur in these regions (United Nations, 2015:20). The South African National Department of Health (NDoH) in partnership with the United Nations still has a critical role to play in directing leadership in the fight against neonatal mortality (NDoH, 2012:7).

In a fast-paced developing world, which puts emphasis on innovation and competitiveness, it is of paramount importance that acquisition of knowledge is prioritised in order to improve healthcare service delivery. Effective use of up-to-date knowledge by health care personnel could thus forestall impediments in the workplace (Baiden *et al.*, 2006: 535). In a health care institution, knowledge of midwives in carrying out their responsibilities, such as resuscitation of neonates could do much to counteract the effect of neonatal mortality. The issue of knowledge transfer which can be done through pre-service and in-service education could serve as a form of empowerment for professional staff, more particularly, midwives (Alavi & Leidner, 2001:107-136).

Midwives play a pivotal role in reducing the neonatal mortality. Training of midwives with regard to neonatal resuscitation is provided formally and informally through undergraduate diplomas or degrees, advanced postgraduate diplomas and in-service training on Helping Babies Breathe (HBB), and Essential Steps in Management of Obstetric Emergencies (ESMOE) in the district. The World Health Organisation (WHO) Guidelines on Basic Newborn Resuscitation recommend that healthcare workers' knowledge and skills be updated regularly, preferably every two years (WHO, 2012:6-7).

The crux of the matter is whether the midwives have the ability to conduct deliveries with the required knowledge in neonatal resuscitation that can improve neonatal outcomes. In reality, effective transfer of knowledge about neonatal resuscitation into practice is not as easy as it may appear. There are only a few studies which have evaluated strategies for knowledge transfer in low-income countries (Monebenimp *et al.*, 2012:11-45; Baiden *et al.*, 2006:206). According to the Canadian Institutes of Health Research (Tetroe, 2011:1-8) knowledge transfer is a "dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health, provide more effective health services and products and strengthen the health care system." Healthcare providers' knowledge and understanding of evidence-based practice is a key to success in reducing neonatal deaths (Lawn *et al.*, 2009:S123–S142). Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, Van Roosmalen and Stekelenburg (2013:4-5) found that evidence-based training in neonatal resuscitation is fundamental in reducing neonatal mortality.

## **1.2 SIGNIFICANCE OF THE PROBLEM**

Midwives are expected to have the appropriate knowledge of neonatal resuscitation while conducting a delivery in order to contribute to the reduction of neonatal mortality and morbidity. However, studies conducted in other countries such as Kenya and Ethiopia have

shown that healthcare workers, including midwives, may not have adequate knowledge in neonatal resuscitation (Murila *et al.*, 2012:11-28; Gebreegziabher, Aregawi & Getinet, 2014:196–202). One could therefore not assume that midwives have adequate knowledge to carry out their professional mandate without a scientific investigation. This study intended to describe the knowledge of registered midwives in neonatal resuscitation at birth, at district hospitals of the Chris Hani Health District in the Eastern Cape. The researcher is of the view that if emphasis could be placed on the knowledge of midwives in their handling of neonates requiring resuscitation, much could be achieved in reducing neonatal morbidity and mortality. The study aimed to evaluate the knowledge of midwives in basic neonatal resuscitation at birth, as this is certainly crucial for the reduction of the neonatal mortality rate.

### **1.3 RATIONALE**

The South African Health Review lays emphasis on the reduction of child mortality, which includes neonatal mortality. Neonatal mortality rates are affected by the competence of midwives (Gray & Vawda, 2015:7). Neonatal health will need to be addressed more effectively to continue the rapid progress in overall child mortality rates. This places midwives' basic neonatal resuscitation knowledge as a critical intervention towards the reduction in neonatal deaths.

Immediately after birth, approximately ten percent of neonates need interventions to facilitate lung recruitment and spontaneous respiration. A full resuscitation procedure is required by less than 1% of neonates, which means that every birth attendant inclusive of midwives need to be well trained with procedural knowledge of basic neonatal resuscitation as a minimum (Szarpak, 2013:73).

The interest of the researcher in the study started as a result of being delegated to reduce the neonatal mortality, and the responsibility of supervising midwives in the Chris Hani District hospitals of the Eastern Cape. The researcher was also entrusted with the task of empowering midwives with the necessary knowledge in carrying out their mandate. The Chris Hani Health District neonatal mortality rate was at 11.9 per 1 000 live births according to the 2013/14 District Health Information System (DHIS) data; of which approximately 30% were during the intrapartum period (Massyn, Day, Peer, Padarath, Barron & English, 2014:300). During District Clinical Specialist Team (DCST) supportive visits to district hospitals, conducted by attending perinatal morbidity and mortality review meetings, a high incidence of intrapartum hypoxia related deaths was observed in the Chris Hani Health District.

The researcher gives recognition to the fact that to resuscitate effectively, midwives need knowledge, attitudes, skills and experience. The training of midwives with a view of increasing their competence may certainly contribute to the reduction of neonatal morbidity and mortality. According to the World Health Professions Alliance (2007:7), competency is defined as knowledge, attitudes and skills and all these are essential in equipping health workers and particularly midwives to deal with neonatal mortality (WHO, 2011:28). However, for the purpose of this study the focus will be on knowledge.

The study intended to describe the midwives' knowledge of basic neonatal resuscitation at birth as it can be critical in reducing neonatal morbidity and mortality. This was to be achieved by way of ascertaining whether the knowledge of midwives met the set national standards for basic neonatal resuscitation at birth (Lawn *et al.*, 2009: S123–S142).

#### **1.4 RESEARCH PROBLEM**

The high rate of neonatal mortality, especially early neonatal deaths, in the Chris Hani Health District, Eastern Cape is of great concern. Consequently, multi-pronged approaches are being put into place to address neonatal mortality. At the onset of the study, the researcher could find no research undertaken in the Eastern Cape to establish the knowledge level on basic neonatal resuscitation at birth among midwives.

#### **1.5 RESEARCH QUESTION**

As a departure point for this study, the researcher posed the question: "What is the knowledge level on basic resuscitation of neonates at birth among registered midwives working in the Chris Hani Health District, Eastern Cape?"

#### **1.6 RESEARCH AIM**

The aim of the study was to determine the knowledge level of registered midwives on basic neonatal resuscitation, in the Chris Hani Health District Hospital, Eastern Cape.

#### **1.7 RESEARCH OBJECTIVES**

The objectives were to:

- identify the training, qualifications and experience of midwives in neonatal resuscitation.
- determine the knowledge level of midwives on basic neonatal resuscitation at birth.
- describe the relationships between midwives' training, qualifications, experience and their knowledge level in basic neonatal resuscitation.

## **1.8 CONCEPTUAL FRAMEWORK**

The conceptual framework for this research was constructed based on the literature of the grounded theory of knowledge management (Jennex, 2008:33) and the theory of Dr Patricia Benner on the levels of nursing experience (Benner, 2013:402-7).

The research of Bennet and Bennet (2004:1) into knowledge, established that there is a correlation between knowledge and corresponding levels of learning and action. The aforementioned study also underpins that knowledge within an organisation determines organisational performance. In this case, the knowledge of midwives in the resuscitation of neonates will determine the extent to which midwives are able to reduce the rate of neonatal deaths at birth. According to Jennex (2008:33), organisational knowledge is essential for the structuring of knowledge and its adaptation in organisations. It is through learning that organisations acquire knowledge. Midwives as part of the health care professionals play a critical role in knowledge generation and management, which are vital in neonatal resuscitation and reduction of neonatal mortality. What is critical in knowledge generation and management is the ability of midwives to transfer knowledge in order to improve their professional practice.

Knowledge can be viewed as a form of empowerment in equipping midwives to deal with neonatal mortality, especially in the resuscitation of neonates. Therefore, different types of knowledge may invariably contribute to equipping midwives in addressing neonatal mortality (De Jong & Ferguson-Hessler, 2010:106-7).

### **1.8.1 Types of knowledge**

#### **1.8.1.1 *Situational knowledge***

This is a type of knowledge that is typified in a particular situation (De Jong & Ferguson-Hessler, 2010:106-7). The midwife needs to know how to identify a non-breathing neonate at birth and be able to commence resuscitation within 'The Golden Minute'; which is the first minute after birth, when prompt action to stimulate breathing or begin ventilation is vital to a successful outcome (American Academy of Paediatrics, 2011:18-19).

#### **1.8.1.2 *Conceptual knowledge***

It is a connected web of knowledge, a network in which the linking relationships are as prominent as the discrete bits of information (De Jong & Ferguson-Hessler, 2010:106-7). This type of knowledge refers to how one defines facts, concepts and principles applied in the resuscitation of neonates at birth as outlined in the algorithm of neonatal resuscitation according to guidelines, such as the WHO guidelines on Basic Newborn Resuscitation, HBB, and Essential Steps in Management of Obstetric Emergencies (ESMOE).

### **1.8.1.3 Procedural knowledge**

This refers to a series of procedures that are to be followed in performing a particular task. In the resuscitation of neonates a midwife has to know the steps to follow in the resuscitation of neonates as outlined in the relevant guidelines (De Jong & Ferguson-Hessler, 2010:106-7).

Knowledge is not always at the same level and it varies in terms of simplicity and complexity.

### **1.8.2 Levels of knowledge**

Levels of knowledge could differ in terms of being deep or just superficial or surface knowledge (De Jong & Ferguson-Hessler, 2010:107-8). Different levels of knowledge are as follows:

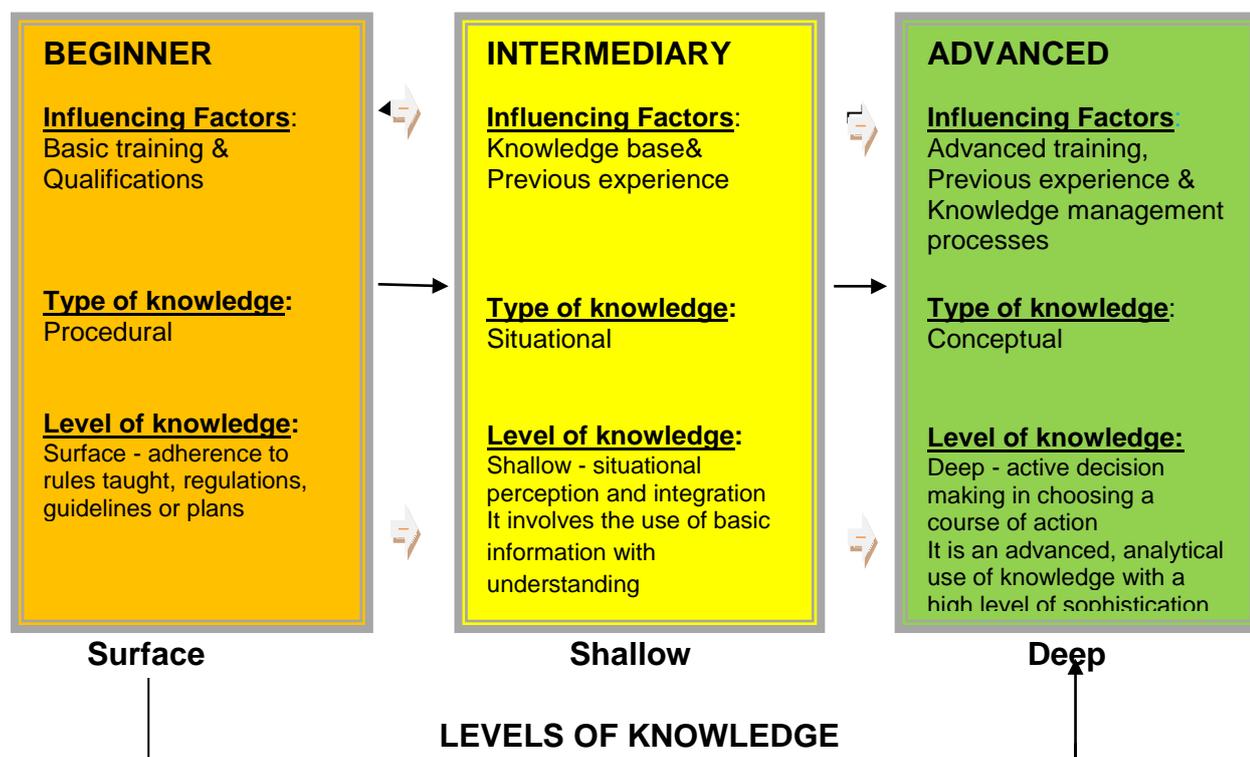
**Surface knowledge** is elementary or basic knowledge. Surface knowledge relates to rote learning or memorising without integrating concepts. In the context of learning resuscitation skills it may refer to memorising facts without being able to apply it in context. This type of knowledge is about visible choices that demands little understanding. The first level of training in basic neonatal resuscitation is about basic issues that are pertinent in the delivery of neonates. It is about the basic use of apparatus, for example, just knowing how to use HBB equipment, such as an action plan chart without understanding the implication and the significance thereof (Bennet & Bennet, 2004:4).

**Shallow knowledge** is a combination of having information and some understanding. In the case of midwives, it will mean knowing that the HBB programme is used for resuscitation of neonates (Bennet and Bennet, 2004:4).

**Deep knowledge** relates to understanding and integrating concepts; linking it to previous experience; being able to provide a rationale for actions. It is usually when one gets beyond surface knowledge and gets deeper into the operation of procedures or how operations are being undertaken (Bennet & Bennet, 2004:4). This will certainly form part of intermediate training and advanced level of midwifery training where midwives use a higher level of knowledge in the execution of their tasks in the delivery of neonates and also managing more complicated cases. In the case of midwives, deep knowledge may imply the knowledge of knowing to go beyond basic neonatal resuscitation, such as HBB to advanced neonatal resuscitation, such as intubation of the neonate.

In accordance with the theory of Benner (2013:402-7) from novice to expert, the researcher is of the view that in the novice stage, a midwife follows rules as given, without context, with no sense of responsibility beyond following the rules exactly. Then as an advanced beginner he/she acquires limited situational perception on knowledge of neonatal resuscitation.

Competence develops when the individual develops organising principles to quickly access the particular rules that are relevant to the specific task at hand; hence, competence is characterized by active decision making in choosing a course of action. Knowledge management by the midwives in one way or another plays a role in combating neonatal deaths as shown in Figure 1.1 (Jennex, 2008:33; Benner, 2013:402-7).



**Figure 1.1: Conceptual framework as adapted from Benner, P. using From Novice to Expert Model**

*(Benner, 2013 & Jennex, 2008)*

*(Figure by researcher)*

Key concepts that may influence the type and level of knowledge are training, experience and the qualifications of midwives in neonatal resuscitation. Training refers to efforts done to capacitate midwives, such as on site in-service training and neonatal resuscitation drills. Experience refers to acquired knowledge of midwives in the resuscitation of neonates. On the other hand, qualifications refer to the academic achievement of the midwives in terms of their qualifications and specialisation in advanced midwifery and neonatal nursing science. Transfer of knowledge to midwives may occur through training in terms of formal qualifications in midwifery, short courses and workshops. Training has the ability to deepen knowledge which is exemplified through experience and attainment of qualifications (Alavi & Leidner, 2001:107-136).

## **1.9 RESEARCH METHODOLOGY**

A brief description of the research methodology is provided in this chapter.

### **1.9.1 Research design**

A quantitative descriptive correlational design was employed to investigate the knowledge in basic neonatal resuscitation at birth of the registered midwives working in maternity wards at the district hospitals of the Chris Hani Health District in the Eastern Cape.

### **1.9.2 Study setting**

The study was conducted in the maternity wards of 13 district hospitals of the Chris Hani Health District in the Eastern Cape.

### **1.9.3 Population and sampling**

The target population of this study was all registered midwives, excluding community service practitioners allocated in 13 maternity wards of the district hospitals of the Chris Hani Health District (N=145).

Due to the relatively small population size, the researcher chose to select the total population of all midwives working in maternity wards in the Chris Hani Health District hospitals for the administration of the questionnaires (Burns & Grove, 2009: 355).

#### **1.9.3.1 Inclusion criteria**

All permanently employed registered midwives working in maternity wards of the Chris Hani Health District hospitals were eligible to participate in the study.

#### **1.9.3.2 Exclusion criteria**

Community service practitioners working in maternity wards were excluded as they were rotated every 2 to 3 months in all wards.

### **1.9.4 Instrumentation**

A structured self-administered questionnaire was developed specifically to collect biographical data and determine the knowledge of basic neonatal resuscitation. The researcher designed appropriate question items, which were intended to measure midwives' understanding of basic neonatal resuscitation as outlined in the WHO Guidelines on Basic Newborn Resuscitation, Perinatal Education Programme – Newborn Care, South African National Guidelines on Basic Neonatal Resuscitation and the HBB training manual.

### **1.9.5 Pilot study**

A pilot study was conducted prior to the study in December 2015 in one district hospital. Seven midwives participated in the pilot study.

### **1.9.6 Reliability and validity**

Content and face validity of the instrument was ensured by developing the questionnaire based on the literature, expert review and conducting a pilot study. Reliability was ascertained by adhering to the data collection procedures outlined in the study protocol. The multiple choice question format used in the questionnaire was not suitable for reliability measures.

### **1.9.7 Data collection**

Prior to the pilot study the researcher trained two fieldworkers to hand deliver self-administered questionnaires in sealed envelopes to the selected district hospitals and supervise completion thereof at times arranged by the researcher. Data collection took place between the 4<sup>th</sup> of January 2016 and the 31<sup>st</sup> of March 2016.

### **1.9.8 Data analysis**

The raw data was captured on an Excel worksheet by the researcher and analysed with STATA (version 13) program by a statistician at the Biostatistics Unit, Stellenbosch University.

### **1.9.9 Ethical considerations**

The research proposal was reviewed and approved by the Health Research Ethics Committee (HREC) of Stellenbosch University (Ethics reference number S15/07/146). Ethical clearance for conducting research was also requested and granted by the Eastern Cape Department of Health and hospital managers, as well as nursing service managers of the specific district hospitals. The researcher applied the ethical principles as described in the Declaration of Helsinki in this study (Holm, 2013: 1232–1235).

### **1.9.10 Right to self-determination**

Autonomy was applied by informing participants of their right to voluntarily participate in the study, as well as supplying an information leaflet and obtaining informed consent. Justice was maintained by respecting the participants' rights to choose freely and not being forced to participate in the study, as well as not discriminating against those not partaking in the study. The participants were also informed that they were allowed to withdraw from the study at any time without penalty. Furthermore, by using the fieldworkers, the researcher ensured that the participants did not feel intimidated to participate since they did not know the fieldworkers.

### **1.9.11 Right to confidentiality and anonymity**

Confidentiality was maintained by keeping all privileged information private. All the questionnaires were numbered so that the researcher could not link the responses to certain

participants. The participants completed the questionnaires in their private ward meeting rooms with the fieldworkers in their presence. Neither hospital nor midwives' names were used during the presentation of study results in any way. Furthermore, only the researcher, the statistician, supervisor and co-supervisor had access to the collected data. Publications of the findings after completion of the research will be done as accurately and objectively as possible. Where sub-standard knowledge was identified, recommendations will be presented in general. All questionnaires and consent forms will be protected and kept in a safe locked cabinet for five years as the raw data has been analysed. Electronic data files will be stored in password protected folders and also kept for five years.

#### **1.9.12 Right to protection from discomfort and harm**

The use of the ethical principle of beneficence demands that above all, we do what is good to benefit someone. Beneficence was applied by doing well to participants by taking them into consideration during the study. The data collection did not interfere with their routine work as it took place during in-service training time and prior to shift commencement for the night shift participants. The night shift participants were requested to come in earlier, therefore they were slightly inconvenienced. The principle of nonmaleficence requires the researcher to do no harm to the participants. Nonmaleficence was assured as the participants were not harmed in any physical or emotional manner by participating in the study. The researcher will provide a synopsis of the findings and recommendations of this research to all hospitals that have participated in this research project.

#### **1.10 OPERATIONAL DEFINITIONS**

**Asphyxia** is defined as the state of not being able to breathe (Woods, 2014:14).

**Competence:** According to Nursing Act 33 of 2005, R786 Regulations Regarding the Scope of Practice of Nurses and Midwives; **competence** means the manner in which one can show a level of performance demonstrating the proper application of knowledge as required by the nursing ethical standards (Government Notice No.36936, 2013:1).

**Hypoxia:** This is a deficiency of oxygen reaching the tissues of the body (Woods, 2014:14).

**Intrapartum:** The intrapartum period extends from the beginning of contractions that cause cervical dilation to the delivery of the newborn and placenta (Woods, 2014:14).

**Knowledge:** In this study knowledge refers to facts, information and skills acquired by a person through experience or education; the theoretical or practical understanding of a subject (De Jong & Ferguson-Hessler, 2010:106-7).

**Midwife:** Is a person who is qualified, competent to independently practise midwifery in the manner and the level prescribed, and who is capable of assuming responsibility and accountability for such practice according to section 31 subsection 1(b) of the Nursing Act 33 of 2005 (South African Nursing Council, 2005:18). The World Health Organisation also defines a midwife or nurse midwife as someone who provides health care and has completed a certified or accredited midwifery training course in the country of practice (WHO, 2011:28).

**Neonatal mortality:** Can be defined as the death of a newborn child from birth to 28 days or four weeks of life (Pattinson, 2013:17).

### **1.11 DURATION OF THE STUDY**

Ethics approval was obtained from HREC of Stellenbosch University on the 10<sup>th</sup> of November 2015 (Appendix 1). Ethical clearance for conducting research was granted by the Eastern Cape Department of Health on the 26<sup>th</sup> of November 2015 (Appendix 2). The pilot study was conducted between 17 and 31 December 2015. Data collection took place between the 4<sup>th</sup> of January and the 31<sup>st</sup> of March 2016. The thesis was submitted for examination in December 2016.

### **1.12 CHAPTER OUTLINE**

#### **Chapter 1: Foundation of the study**

Chapter 1 describes the scientific foundation which includes the rationale, problem statement, aim, objectives, the conceptual framework which guides the study and brief overview of the research methodology.

#### **Chapter 2: Literature review**

In this chapter a literature review about the knowledge of basic neonatal resuscitation among midwives is described.

#### **Chapter 3: Research methodology**

In chapter 3 the research methodology applied in this study is described.

#### **Chapter 4: Results**

Data analysis and interpretation of the findings are described in this chapter. Data is presented in frequency tables and graphs.

#### **Chapter 5: Discussion, conclusions and recommendations**

Discussion, conclusions and recommendations based on scientific evidence are described.

### **1.13 SIGNIFICANCE OF THE STUDY**

This study assessed midwives' knowledge with a view of determining their ability to render their duties in the potential need for resuscitation of a neonate at birth. The results of the study will contribute to the on-site training and support of the registered midwives in the district, province and the country. Recommendations of this research may add value in particular to the Eastern Cape strategies in achieving the SDG three of 2030. This study may further contribute to the National Department of Health Strategy Plan to bring about much awaited reforms in the health sector with a view to improve service quality of care.

### **1.14 SUMMARY**

The study sought to describe the knowledge of basic neonatal resuscitation at birth among midwives as a concerted approach to address neonatal mortality at district hospitals in the Eastern Cape. This is in line with strategies aimed at reducing neonatal deaths and contributes to the National Department of Health Strategic Plan on reducing child mortality. A brief overview of the research methodology, ethical considerations and study duration are given.

### **1.15 CONCLUSION**

This chapter introduced neonatal mortality rates in district hospitals as a problem that needs to be addressed. Midwives' knowledge of resuscitation of neonates was proposed as a solution to the problem. Arguments were presented to support an investigation into the knowledge level of midwives on basic neonatal resuscitation at birth in order to provide scientific evidence that can inform training strategies in the Chris Hani Health District and beyond.

In the next chapter a literature review based on the objectives of the study and the conceptual framework will be discussed.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 INTRODUCTION

Chapter one laid the foundation for this study by putting forward the research problem, rationale for the study, objectives of the study, the conceptual framework which guided the study, as well as the outline of subsequent chapters. In this chapter a literature review of the knowledge of basic neonatal resuscitation among midwives at district hospitals, as well as different approaches or strategies undertaken in various countries that are aimed at ensuring that midwives have the required knowledge of undertaking neonatal resuscitation, with a view to reducing neonatal deaths, is provided.

Studies done globally show that there is an increase in neonatal deaths worldwide which is as a result of intrapartum asphyxia/hypoxia related to neonatal resuscitation at birth (Murila *et al.*, 2012:11-28; Monebenimp *et al.*, 2012:25).

Midwives can play a pivotal role in reducing neonatal deaths if they have the required knowledge of basic neonatal resuscitation. The fight for reducing neonatal mortality calls for multifaceted approaches and this study probes the role that midwives could play in this regard (Monebenimp *et al.*, 2012:11-45).

The literature review is based on the role of midwives in reducing neonatal mortality due to intrapartum asphyxia. Furthermore, it indicates neonatal resuscitation as key in reducing neonatal deaths at birth as well as the knowledge of midwives regarding neonatal resuscitation at birth. In addition, it includes approaches or strategies that are applied in various countries in order to stem neonatal deaths by means of ensuring that midwives have the required knowledge in neonatal resuscitation.

### 2.2 ELECTING AND REVIEWING THE LITERATURE

According to Burns and Grove (2007:93), a literature review is an organised written presentation of what has been published on a particular topic by different scholars. The aim of the review is to communicate to the reader any relevant and current information about the topic under study. Through the literature review one is able to establish what information regarding the research problem has been gathered, conclusions that have been arrived at and what additional knowledge is needed regarding the research topic. The literature also provided the researcher with a context for examining the problem under study.

### 2.2.1 Search method

A literature investigation was done by searching the databases: CINAHL, PubMed, Science Direct, and Wiley on line. Key words used for the search were: “evaluation”, “competence”, “midwives”, “health care providers”, “neonatal deaths”, “causes of neonatal mortality” and “district hospital”. The investigation covered a period from 2005-2016. An overall number of 22 articles were chosen and formed part of the literature review. The articles included: eight quantitative studies; seven qualitative studies and seven literature reviews.

### 2.3 NEONATAL MORTALITY RATES

The literature has shown that there is a variety of factors that contribute to the worldwide problem of neonatal mortality (Opondo *et al.*, 2009:1165-72). Intrapartum or birth asphyxia remains one of the leading causes of neonatal deaths accounting for approximately one-third of early neonatal deaths (Lawn *et al.*, 2009: S123–S142).

The other two leading causes of child mortality are immaturity and infection (Opondo *et al.*, 2009:1165-72). Research has also singled out intra-partum asphyxia / hypoxia as one of three leading causes of neonatal mortality in South Africa (Velaphi, 2011:29). Intra-partum asphyxia or hypoxia has been widely researched with recommendations of interventions in the health system put in place for health care workers to implement (Opondo *et al.*, 2009:1165-72).

The Saving Babies 2012-2013: Ninth report on perinatal care in South Africa (Pattinson & Rhoda, 2014:18-19) confirms that most neonatal deaths occur in district hospitals, as do most births. The leading causes of neonatal deaths have been identified accordingly as immaturity-related, intrapartum hypoxia, congenital abnormalities and infections. The mortality rates in the district hospitals are the highest. Intrapartum birth asphyxia is the most common category in fresh stillbirths in community health centres and district hospitals. Intrapartum hypoxia affects mostly larger babies and improvements in maternal care, especially intrapartum monitoring and care, as well as adequate neonatal resuscitation, would prevent many of these deaths (Pattinson & Rhoda, 2014:18-19).

According to Pattinson (2013:17), current studies reveal that there is a lack of trustworthy data reporting the numbers and rates of neonatal deaths, due to the fact that neonatal deaths that occur in the first hour after birth, are less likely than other neonatal deaths to be reported. Numbers of neonatal deaths vary according to the type of hospital. The Sixth Perinatal Care Survey reported that 56.7% and 31.5% of health care provider associated causes of neonatal deaths occurred in district and regional hospitals, respectively (Pattinson, 2009:19). Perinatal mortality rates for intrapartum asphyxia and birth trauma were the

highest in district hospitals at 8.29/1000 births, followed by regional hospitals at 5.65/1000 births. This was 46.7% higher than regional hospitals. The avoidable mortality rate for health care providers was highest in district hospitals (7.04/1000 births). The mortality reviews have identified that a number of deaths related to intrapartum asphyxia and birth trauma could be prevented (Pattinson, 2009:36-37).

The Perinatal Problem Identification Programme (PPIP) is a national computerised programme used as a tool to make the perinatal and maternal death audit easier in an effort to improve the care that mothers and babies receive. Institutions that conduct deliveries register on the site, enter their data and instantly do extensive data analysis. They even present graphical data and print a report which shows the causes of deaths, as well as avoidable factors. PPIP reveals that health care worker-associated missed opportunities are amongst the top five modifiable probable avoidable factors that contribute to neonatal deaths in South Africa (Pattinson, 2013:17).

The problem presents itself more acutely in low-income countries as compared to higher income ones. In particular, there is a significant occurrence of neonatal deaths in South Asia and sub-Saharan Africa. Baiden *et al.*, (2006: 532) indicate that the majority of these deaths occur in sub-Saharan Africa which account for approximately a quarter of all deaths in children aged one to three months.

Inequitable access to obstetric and immediate postnatal care contributes largely to neonatal deaths. This is also exacerbated by the low socio-economic status of a region/area as compared to the one with high socio-economic status. For example, in Nigeria the Neonatal Mortality Rate (NMR) is 23 per 1 000 live births in the highest income quintile as opposed to 53 for newborn babies in the lowest income quintile families (Lawn *et al.*, 2009:S123–S142).

Neonatal deaths have taken a high toll in South African hospitals which impacts negatively on the initiatives of the NDoH to achieve its goals of increasing the standard of health through the provision of ideal health care in its health centres (Opondo *et. al.*, 2009:1170). South Africa as part of sub-Saharan states falls within countries with the least development in the management of neonatal mortality over the last 20 years (Pattinson, 2013:17). As such, the goal of the Department of Health in the Eastern Cape as aligned to the NDoH's goals is to reduce child morbidity and mortality rates in the province (Opondo *et. al.*, 2009:1165-72). This has been necessitated by the worrisome trend by which in 2009 neonatal deaths accounted for 42% of under-5 child mortality in comparison to 37% in 2000.

## **2.4 GOALS FOR REDUCING THE RATES OF NEONATAL MORTALITY**

The turn-around target for the attainment of the MDG's was 2015, but the review of the work done in many developing countries established that some of the goals, such as those dealing with maternal, neonatal, child and reproductive health were not achieved (United Nations, 2015:9). As a result, the new SDG's for 2030 have been set up in order to scale up progress and build on achieving earlier targets of the MDG's which were not realised, especially in accessing the most vulnerable people. The new parameters for maternal, neonatal and child health for 2030 fall under Goal 3: to ensure healthy lives and promote the well-being for all at all ages. The focus is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births (United Nations, 2015:20). The emphasis is that by 2030, there must be a noticeable reduction in the mortality of neonates and children younger than 5 years of age in countries to achieve a neonatal mortality rate of 12 per 1 000 live births. According to the Department of Health Strategic Plan 2014/15–2018/19, the 2018/19 target is to reduce the neonatal morbidity rate to less than 6 per 1000 live births from the 2013/14 baseline of neonatal morbidity rate of 14 per 1000 live births (National Department of Health, 2014:24).

A Cameroonian study conducted by Monebenimp *et al.* (2012, 8-14) showed that the high level of the in-service training of midwives, especially in Emergency Obstetric Simulation Training (EOST) drills with regard to the resuscitation of neonates at birth were positively associated with the reduction of neonatal morbidity as well as mortality.

## **2.5 STRATEGIES FOR REDUCING NEONATAL MORTALITY**

In order to find a solution to a problem, one has to devise strategies that would result in the improvement of the situation. It is on this basis that different approaches are explored in order to find a workable implementation plan to reduce neonatal mortality.

### **2.5.1 Interactive neonatal resuscitation strategies**

Interactive neonatal resuscitation refers to a hands-on, interactive, simulation-based learning environment. Approximately 10% of neonates require some assistance to begin breathing at birth, and 1% requires extensive resuscitation (Perlman, Wyllie, Kattwinkel, Atkins, Chameides, Goldsmith, Guinsburg..., 2010:1318).

Although this is a small percentage, the large number of births worldwide means that, overall many neonates require some assistance to achieve cardio-respiratory stability. Interactive neonatal resuscitation referred to as hands-on, interactive, simulation-based type of learning environment is one of the strategies implemented to reduce neonatal mortality. Non-

breathing neonates at birth need to be assessed to determine their need for one or more of the following actions, in sequence:

- Initial steps of stabilisation – dry and provide warmth, position, assess the airway, and stimulate to breathe,
- Ventilation – bag and mask ventilation initially on room air,
- Chest compressions – coordinated with ventilation,
- Medications and volume expansion (Perlman *et al.*, 2010:1319).

Perlman *et al.* (2010:1319-1344) alluded to the fact that the vast majority of neonates do not require intervention to make the transition from intrauterine to extra uterine life and approximately 10% requires some assistance such as neonatal resuscitation. Literature has shown limited data on the effect of a structured neonatal resuscitation programme on the outcomes of depressed neonates requiring resuscitation. However, one needs to know the three effects: mortality; short-term morbidity like hypoxic ischaemic encephalopathy; as well as long-term morbidity like cerebral palsy and mental retardation (Perlman *et al.*, 2010: 1319-1344).

Important aspects of neonatal resuscitation includes planning and preparation for a successful resuscitation in the delivery room by the midwife and the team, as well as outlining the steps to be taken during resuscitation following each other as mentioned previously. There are some other ways of training, other than HBB and Neonatal Resuscitation courses, which incorporate neonatal resuscitation modules, such as ESMOE as well as Paediatric life support. As the midwives deal with obstetric emergencies in ESMOE training, neonatal resuscitation becomes part of their training because they have to save the lives of mother and baby together. As far as Paediatric life support is concerned, an introductory training on resuscitating a newborn is of importance to their knowledge (Raghuveer & Cox, 2011:911-918).

### **2.5.2 Helping Babies Breathe (HBB) as a strategy to reduce neonatal mortality**

HBB is a simulation-based neonatal resuscitation educational programme in resource-limited circumstances for all birth attendants, including midwives, which are developed to help reduce neonatal mortality globally. This is an initiative of the American Academy of Paediatrics and many partners, including the United States Agency for International Development (USAID), The Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), Saving Newborn Lives/Save the Children, and the Millennium Villages Project. The objective is to ensure that all babies are born in the presence of a skilled birth attendant. It was developed on the premise that assessment at birth and simple newborn care are things that every baby deserves. The initial steps taught

in HBB can save lives and give a much better start to many babies who struggle to breathe at birth. The focus is to meet the needs of every baby born. HBB emphasizes the need for skilled attendants at birth, assessment of every baby, temperature support, stimulation to breathe, and assisted ventilation as needed; all within 'The Golden Minute' after birth (Academy of Paediatrics, 2015:7).

The goal of HBB is to reduce the apparent fresh stillbirth rates, neonatal mortality and improve infant survival. The educational kit comprises of an action plan, a culturally adopted flip-over facilitator guide and a student workbook (Ersdal & Singhal, 2013:1-2). Though the educational kit is to be used by midwives, it can be used by community health workers with minimal basic training and supervision.

There are basic issues that are to be understood by the midwives in regard to neonatal resuscitation including initial preparation of the labour ward for possible neonatal resuscitation at birth and the checking of the basic essential equipment for neonatal resuscitation. Once the neonate is delivered, effective drying of the neonate, clearing of the airway as well as stimulating breathing is done. In addition within one minute of birth, if the need is identified, the midwife needs to be able to provide effective bag and mask ventilation (Murila *et al.*, 2012:11-28). In the resuscitation of neonates a midwife has to know which procedures to follow as outlined in neonatal resuscitation guidelines (De Jong & Ferguson-Hessler, 2010:106-7). The most critical knowledge is of 'The Golden Minute' in neonatal resuscitation; which seeks to ensure that a neonate who does not start breathing despite thorough drying and additional stimulation, receives positive-pressure ventilation to initiate breathing within one minute after birth (Fullerton, Johnson, Thompson & Vivio, 2010:7).

During neonatal resuscitation a midwife has to know which procedures to follow in the resuscitation of neonates as outlined in basic HBB. HBB ensures that a midwife is able to prepare the mother who is in labour for birth and attend to a neonate in an acceptable time span. It focuses on immediate assessment of the neonate, stimulation to breathe and the need for neonatal bag and mask ventilation (BMV), monitoring and support, all within 'The Golden Minute' after birth (Ersdal & Singhal, 2013:1). The overarching reason for the use of HBB stems from the scientific basis of neonatal resuscitation which is premised on neonatal evidence based guidelines set out by the International Liaison Committee on Resuscitation (ILCOR) (Ersdal & Singhal, 2013:1). These guidelines are aimed at:

- improving maternal and newborn health;
- ameliorating the care provided in the households by women and families;

- boosting community support for maternal and newborn health; and enhancing access to, and use of, skilled care, community care, especially with curative services that can prevent around 25% of neonatal deaths (Flatman, 2015:10).

However, secondary prevention of neonatal deaths, which is based on immediate basic resuscitation of a non-breathing newborn baby, can effectively reduce a large proportion of neonatal deaths. The simplicity in the application of the basic resuscitation procedure by health workers appears to be the most effective in achieving ideal results (Ersdal & Singhal, 2013:1-2).

For the programme on newborn stabilisation and support to succeed in a resource-limited setting, practitioners, in this case the midwife can make the difference between life and death by adhering to the basic steps of helping a baby to breathe through the use of HBB. It is necessary to make the programme simple and flexible. It should be tailored to the needs of individual midwives. Knowledge of the use of the educational kit, the HBB and the requisite skills needed are to be shaped to the extent to which they could meet the desired level of competency (Ersdal & Singhal, 2013:1).

The World Health Organisation (WHO) has developed guidelines on newborn resuscitation, on how to handle a non-breathing neonate at birth. According to WHO, there is irrefutable evidence that the HBB has significantly improved perinatal outcomes (WHO, 2011:24-28). A study which was conducted in Tanzania to improve the effectiveness of the use of HBB yielded positive outcomes when midwives adhered to the guidelines on basic resuscitation as set out by the WHO (Ersdal & Singhal, 2013:2-3).

In its initiatives to halt neonatal mortality, the Indian government initiated a programme on basic neonatal care and resuscitation named Navjaat Shishu Suraksha Karyakram (NSSK), which serves as their equivalent of HBB, in order to address important interventions at the time of birth. Their target is to have one person trained in basic newborn care and resuscitation at every delivery (Upadhyay, Chinnakali, Odukoya, Yadav, Sinha, Rizwan, Daral, Chellaiyan & Silan, 2012:2). Furthermore, the Indian government has realized the importance of stakeholder participation and mobilisation in the fight to reduce neonatal death and in improving the quality of life through health care. The objective is to train community health workers so that they can partner with the government in tackling health related issues such as neonatal deaths. The government's elaborate plan of tackling neonatal deaths through stakeholder mobilization and training of both professional and community health workers yielded positive outcomes as neonatal mortality decreased from 120 per 1 000 live births to 40 per 1 000 live births (Upadhyay *et. al.*, 2012:2).

### 2.5.3 Other strategies to reduce neonatal mortality

A study was done on the trends and causes of neonatal mortality in the Kassena Nankana-District (KND) in Ghana. The latter is an area situated in the northern part of Ghana which is mainly rural and has a low socio-economic status, hence the low educational level of its people. There are four health care centres strategically located in the four geographical cardinals and district referral hospital in Novongo. Health care is provided by medical assistants and community health centres. These centres offer antenatal, delivery and child welfare services. Only about 20% of births are attended by skilled midwives. The leading causes of neonatal deaths were singled out as malaria, diarrhoea and acute respiratory tract infections and meningitis (Baiden *et al.*, 2006:533).

The research conducted in Ghana shows that unskilled attendance (62%) was one of the leading causative factors of neonatal deaths (Baiden *et al.*, 2006:533). The results of the investigation showed a lower rate in neonatal deaths in rural and low socio-economical KND over a period of the study. A decline in neonatal deaths noticed, was attributed to a number of intervention strategies such as: a community health and family planning project which involved deployment of nurses with basic midwifery skills to the community. It also involved health education campaigns; a good referral system; maternal immunisation with tetanus vaccine and multiple health research activities undertaken in the district over many years (Baiden *et al.*, 2006:534).

What is noteworthy about the study in Ghana is that it discounted the notion that only expensive, high level technology and facility-based care can substantially reduce neonatal mortality. It established evidence that high neonatal mortality rates can be reduced even in the settings where there is inadequate provision of resources, such as those in Ghana and the three villages in Gambia (Baiden *et al.*, 2006: 535).

A study conducted in the Republic of Bulgaria aimed at reducing the neonatal mortality rate due to perinatal and intrapartum asphyxia and its consequences. They achieved this by furnishing delivery rooms of the hospital with resuscitation equipment, providing training in neonatal resuscitation and improving the qualifications of the personnel who were neonatologists, obstetricians and midwives (Vakrilova, Elleau & Slüncheva, 2004: 35-40).

The first positive results of this programme were a significantly reduced neonatal mortality rate from 7.8% in 2001 to 6.8% in 2003 ( $p < 0.05$ ). Secondly, asphyxia as a mean cause of death in the neonatal period was 9% in 2001 and dropped to 8% in 2003 (Vakrilova *et. al.*, 2004: 35-40).

## 2.6 KNOWLEDGE ON NEONATAL RESUSCITATION IS KEY IN REDUCING NEONATAL DEATHS AT BIRTH

There is validity in the assertion that knowledge is power. It would thus be beneficial to ensure that midwives are engaged in knowledge development as a means of empowerment so that this may increase proficiency in their work (De Jong & Ferguson-Hessler, 2010:106-7). Accordingly, one will have to look at ways in which midwives could be emboldened with knowledge which could enable them to address the challenge of tackling neonatal deaths.

Monebenimp *et al.* (2012:11-45) assessed the competence on neonatal resuscitation among health care providers, including midwives, by direct observation of how the newborns were handled. The observational study conducted at a level one health facility in Cameroon, enrolled 10 health workers that took care of 340 newborns in the delivery room. Many participants scored poorly on basic questions related to infection prevention, such as hand-washing, proper handling of contaminated instruments and proper disposal of medical waste. The authors concluded that a lack of skills in handling neonates is one of the contributing factors to the scourge of neonatal deaths (Monebenimp *et al.*, 2012:8-14).

This lack of skills is more pronounced in sub-Saharan Africa and South Asia where skilled birth attendance in these regions is marked by low coverage of <50% and low density of human resources of <0.9 per 1000 population. If these current rates remain the same, by 2015 skilled birth attendance will only reach one out of every two women in the same region (Lawn *et al.*, 2009: S123–S142).

In a quasi-experimental study done in 10 district facilities in Pakistan to assess training needs, skills and attitudes of 370 health care providers in Maternal Neonatal and Child Health services, it was found that there was a need to improve knowledge and skills through continuous education and relevant training (Ariff, Soofi, Sadiq, Feroze, Khan, Jafarey, Ali & Butta, 2010:10-319). Furthermore, neonatal resuscitation knowledge and skills were found to be inadequate in another study of 192 health care providers in Kenya (Monebenimp *et al.*, 2012; 11-78).

A Pakistani study conducted to evaluate the knowledge of health practitioners in the resuscitation of neonates found that health practitioners performed poorly on the resuscitation of neonates. This study highlights that much has to be done to empower health practitioners with the necessary knowledge capacity in order to enable them to carry out their work in accordance with set guidelines by the WHO in the resuscitation of neonates (Ariff *et al.*, 2010:10-309).

In Benin, Ecuador, Jamaica and Rwanda, a study was undertaken to assess skilled birth attendants, including midwives for competence in five maternal and neonatal mortality settings, inter alia knowledge in neonatal resuscitation with ambu-bag and immediate newborn care. Midwives scored 59% and 52.7% respectively, which makes a strong case for increasing the knowledge base of health practitioners if the war against neonatal mortality is to be won (Harvey, Blandon, McCaw-Binns, Sandino, Urbina, Rodriguez, Gomez, Ayabaca & Djbrina, 2007:788).

An Ethiopian study showed that one of the ways which is critical in reducing neonatal mortality is the training of midwives on neonatal resuscitation. Therefore, emphasis should be placed on determining the extent of conceptual knowledge of midwives in order to increase their competence (Gebreegziabher *et al.*, 2014:198). The importance of investigating the knowledge of health care providers in the resuscitation of neonates was further highlighted in the studies conducted in Poland and Kenya. These studies singled out a lack of knowledge of health care providers as a critical concern in the management of neonatal resuscitation (Szarpak, 2013:72-75; Murila *et al.*, 2012:11-28). The study in Poland found that midwives' lack of knowledge of neonatal resuscitation could possibly be responsible for perinatal asphyxia (Szarpak, 2013:72-75).

A large-scale study conducted in Afghanistan on health care providers' knowledge in neonatal resuscitation found that midwives exerted themselves as equally capable as doctors, in performing newborn resuscitation, which validates the basic neonatal resuscitation training provided in undergraduate midwifery education (Kim *et al.*, 2013:4-5).

Furthermore, the Afghanistan study also highlighted that once the midwives are appointed for service, they have to undergo mandatory training on neonatal resuscitation. The results indicate that pre-service and in-service training of midwives in neonatal resuscitation play a crucial role in ensuring that they have the necessary knowledge and skills regarding the prevention of neonatal deaths (Kim *et al.*, 2013:4-5). It is however crucially important that midwives adhere to the guidelines on the identification of warning signs of birth asphyxia and neonatal resuscitation guidelines in order to avert neonatal deaths (Kim *et al.*, 2013:50).

Another similar study undertaken in Malawi concludes that early identification, prevention and proper management of birth asphyxia are critical in the reduction of neonatal deaths in Malawi (Chikuse, Chirwa, Maluwa, Malata & Odland 2012:351-357). The study also found that generally midwives have a good understanding of birth asphyxia. However, the study indicates that there are gaps in their ability to identify warning signs of birth asphyxia through partograph use (Chikuse *et al.*, 2012:351-357). Furthermore, the midwives obtained low

scores in adhering to nine out of 21 steps of the resuscitation guidelines. It is of importance that midwives need to adhere to guidelines on identification of warning signs of birth asphyxia, as well as immediate neonatal resuscitation. In general, the study shows good understanding of midwives about birth asphyxia and the monitoring and proper use of partographs are instrumental for early identification of prolonged labour or a way of identifying warning signs of birth asphyxia. The study also underscores the importance of attendance of in-service training by the midwives as helpful in making them more efficient in carrying out of their duties especially with obstetric emergencies in order to improve neonatal care and outcome (Chikuse *et. al.*, 2012:351-357).

In a health care institution, knowledge of midwives in carrying out their responsibilities such as resuscitation of neonates could do much to counteract the effect of neonatal mortality. Velaphi and Rhoda (2012:69-70) argue strongly for the empowerment of midwives with the necessary knowledge that would enable them to carry out their work with a high level of competence. It is on the basis of the need for midwives to excel in their work through acquisition of knowledge that standards were set by the European Union Standards for Nursing and Midwifery (Keighley, 2009:5-24). Similarly, the South African Nursing Council has also set neonatal care standards for the Post-Basic Diploma as well as Bachelor's Degree in Advanced Midwifery and Neonatal Nursing Science (South African Nursing Council, 2005:1-7). Proactive measures can be taken in South Africa in which midwives could be in the forefront of the battle to reduce neonatal mortality. On the other hand, the high death rate of neonates in public hospitals in South Africa could be prevented by means of better health care provision and the optimum training of midwives (Velaphi and Rhoda, 2012:69-70).

## **2.7 TRAINING OF MIDWIVES AS PART OF KNOWLEDGE TRANSFER**

Training is a mechanism which enables an individual to be able to perform a task in accordance with set expectations. Without proper training, the workforce will be unable to discharge their responsibilities in the manner that they could improve their work environment and be experts in the fields in which they are doing their work (De Jong & Ferguson-Hessler, 2010:106-7). In the same vein, there are high expectations that midwives must be offered training that would enable them to do their work with ease.

Genuine attempts must be taken by health practitioners in order to acquire efficiency and effectiveness in their professional work (International Movement, 2015:64). One of the objectives set out by the WHO is to "achieve education and training for all, based on cooperation among all stakeholders". Emphasis is laid on cooperation and equality of

educational opportunities with the aim of achieving favourable learning outcomes. Care must be taken that training must provide a balance between knowledge and skills. However, this must involve the acquisition of both cognitive and non-cognitive skills, including psychological skills and critical thinking (International Movement, 2015, 80-103).

Various studies (Kim *et al.*, 2013:4-5; Upadhyay *et al.*, 2012:2; Gebreegziabher *et al.*, 2014:198; Chikuse *et al.*, 2012:351-357) undertaken in different countries such as India, Afghanistan, Ethiopia and Kenya concerning initiatives to reduce neonatal mortality emphasize the training of health practitioners, especially midwives as a key in reducing neonatal mortality. It is critical that midwives must have the basic knowledge and skills to deliver neonates. On the other hand, one can argue that substandard knowledge of health practitioners in neonatal resuscitation and care lead to poor performance. Therefore, satisfactory basic neonatal resuscitation knowledge of midwives as per set guidelines by WHO may result in reduced neonatal mortality (Upadhyay *et al.*, 2012:4-5; Kim *et al.*, 2013:4).

Programmes which cater for the training of midwives differ in content and duration and may comprise of or exclude medical or nursing training beyond midwifery knowledge (WHO, 2007: 783–790). The WHO further set out results from a study conducted in Benin, Ecuador, Jamaica, Rwanda and Nicaragua about skilled birth attendants' skills. Doctors and medical students generally scored higher on knowledge of neonatal resuscitation than midwives, professional nurses and auxiliary nurses (Harvey *et al.*, 2007:85). This research is corroborated by the study evaluating knowledge of neonatal resuscitation of health professionals undertaken by Gebreegziabher *et al.* (2014:199) in the hospital of Northwest Ethiopia. The results of the study emphasised the training of neonatal resuscitation for midwives, nurses and resident doctors. WHO Guidelines on Basic Newborn Resuscitation, as well as HBB training on 'The Golden Minute' also form part of basic neonatal resuscitation training for all birth attendants (WHO, 2012:7).

Pre-service and in-service competence training, supplemented by supportive supervision, is an effective way to build providers' capacity to perform newborn resuscitation. This kind of training could also help with timely intervention at birth whether in the community, at private clinics, or at primary care facilities in order to save the lives of newborns (Alavi & Leidner, 2001:107-136; Kim *et al.*, 2013:50). It also indicates that the resuscitation of neonates is an essential midwifery competency. The pre-service training component of midwifery students underscore competency and knowledge in resuscitation with actual neonates before they graduate after first training in clinical simulation (Kim *et al.*, 2013:50).

The government of India established a high intensity training programme for midwives in order to help them deliver babies at home in rural areas where mothers were not able to reach health facilities. The midwives were taught the basics on how to help a neonate to breathe through the use of a locally produced tube and mask that could be used as a resuscitation device in home-based settings (Upadhyay *et al.*, 2012:2-3). This programme helped reduce neonatal deaths by 47% in one district at a cost of approximately R660.00 (Upadhyay *et al.*, 2012:4).

Similarly, a study in Zambia which focused on training programmes for midwives had a significant impact on decreasing the seven day neonatal death rate in community health facilities. The training of midwives in this instance was focused on essential neonatal resuscitation and care. The neonatal death rate decreased from 11.5 deaths per 1 000 live births to 6.8 deaths per 1 000 live births. In the same vein, similar studies undertaken in Sri Lanka, Thailand, Malaysia and Pakistan for up scaling the training of midwives produced positive results (Upadhyay *et al.*, 2012:4-5).

It has been highlighted in chapter one that midwives play a critical role in halting neonatal deaths worldwide. Furthermore, research has proved that costs and effort in terms of labour could be reduced if the training of midwives is stepped up with regard to the resuscitation of neonates, as well as in neonatal care. The studies conducted in India and Afghanistan underscore the use of cost-effective apparatus which could be locally designed to reach areas which are based far from medical facilities. This is complemented by up scaling training of community workers to supplement the role played by midwives in neonatal resuscitation and care (Upadhyay *et al.*, 2012:2-4; Kim *et al.*, 2013:50).

While conducting a study on neonatal asphyxia, Sidibe, Sangho, Doumbia, Sylla, Keita and Keita (2006:272-276) underscored the importance of training health workers allocated to delivery rooms. The efforts to empower midwives with knowledge so that they can carry out their work with confidence and a high level of competence demand that pre-service training be complemented by on-going in-service training of midwives by a competent team of skilled health practitioners (Kim *et al.*, 2013:3-4).

Monebenimp *et al.*, (2012:8-14) found that the high level of training of midwives especially with regard to the resuscitation of neonates at birth has a positive correlation with the reduction of neonatal deaths at birth. Velaphi and Rhoda (2012:69-70) further sketch the high death rate of neonates in public hospitals in South Africa as something that could be prevented by means of better health care provision and the optimum training of midwives.

## **2.8 CONCLUSION**

In this chapter, the available literature review has provided insight into strategies that could be used in order to reduce neonatal mortality. It has also highlighted the pivotal role that midwives could play in reducing neonatal mortality rates. Knowledge of midwives regarding neonatal resuscitation is a powerful tool at the disposal of midwives in reducing the death rate of neonates. The literature provided the researcher with a context for examining the problem under study and the study results. In the next chapter, chapter 3, the research methodology which was used to conduct this study will be addressed. Additionally, levels of knowledge and levels of experience of midwives serve as the basis for the conceptual framework of this study.

## **CHAPTER 3: RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

Chapter two provided a broad analysis of the literature review on neonatal mortality, knowledge of midwives in handling neonatal resuscitation and training of midwives. This chapter describes the different aspects of the research methodology in detail as outlined in chapter two. The following will be discussed: the study setting, the research design used and the study population and sampling. Some aspects from chapter 2 are discussed, such as the literature used to formulate the data collection tool. The details regarding the data collection and analysis are highlighted.

### **3.2 AIM AND OBJECTIVES**

The aim of the study was to determine the knowledge level of registered midwives on basic neonatal resuscitation in the Chris Hani Health District Hospital in the Eastern Cape. The study objectives were threefold: to identify the training, qualifications and experience of midwives in neonatal resuscitation; to determine the knowledge level of midwives on basic neonatal resuscitation and to describe the relationships between midwives' training, qualifications, experience and their knowledge level in basic neonatal resuscitation.

### **3.3 STUDY SETTING**

The study was conducted in the maternity wards of the 13 district hospitals of the Chris Hani Health District in the Eastern Cape.

According to the 2011 census, the Chris Hani Health District is one of the eight health districts of the Eastern Cape; covering an area of 36 558 km<sup>2</sup>, which is 13% of the total area of the Eastern Cape Province with a total population of 795 461 (Statistics South Africa, 2012:28).

The area is considered a rural district since 95% of the total population is rural or semi-rural. The overall number of district hospitals is 14 but maternity wards are available in 13 hospitals, having 145 registered midwives.

### **3.4 RESEARCH DESIGN**

According to Burns and Grove (2011:537), a research design is a "blueprint" for undertaking a study, which ensures the validity of the findings by minimising the effect of intervening factors. Burns and Grove (2007:38) also state that the choice of the research design

depends on the researcher's knowledge, the problem and purpose of the study and the intentions to simplify the findings of the study. The research design directs the planning and the implementation of the study so that the study reaches its objectives with a high probability of accuracy (Grove, Burns & Gray, 2013:195). There are important considerations that one has to look at in undertaking the research design, namely, probability, bias, manipulation and control. The researcher takes into account the probability that a particular effect might occur as the result of the research design of the study and as such, there must be justification for this probability. In undertaking a study, the researcher becomes as objective as she possibly can in order to avoid bias (a particular viewpoint) which may impair the accuracy of the research. The researcher has taken the necessary steps so that the study is not manipulated in the way that its results may be disputed. Proper controls were exercised to ensure that the reliability and validity of the study were not compromised (Grove, Burns & Gray, 2013:195-197).

A quantitative descriptive correlational design is used to gain more information about the characteristics within a particular field of study. It is also applied to develop theories and identify problems within current practices but does not entail manipulation of variables (Burns & Grove, 2007:240). In this study, a quantitative non-experimental and descriptive approach was employed in order to realise the objectives of this study. The study also established correlation between the level of training, qualifications and experience of midwives and their knowledge level regarding basic neonatal resuscitation. Generally, quantitative research is an essential tool for generating knowledge in nursing science and providing evidence for nursing practice, education and management. It is also considered as the investigation of a phenomenon that intends to achieve precise measurement and quantification, often involving a rigorous and controlled design (Polit & Beck, 2012:739).

Subsequently, the researcher employed a cross-sectional research study since it measures knowledge of midwives at one point in time on knowledge in basic neonatal resuscitation at birth. This was undertaken by the registered midwives working in the maternity wards at the district hospitals of the Chris Hani Health District in the Eastern Cape.

### **3.5 POPULATION AND SAMPLING**

A population is the total set of persons with whom the research question is concerned. The individuals for the study are selected from the population (De Vos, Strydom, Fouché & Delpont, 2011:194). The researcher, at the time of the study, was the district clinical specialist midwife in the Chris Hani District Hospitals and worked with the midwives whom

she supported. This made it easy for the researcher to identify the midwives and know the number of midwives in each hospital falling within Chris Hani District.

The Chris Hani Health District consists of 13 district hospitals with maternity wards. The target population of this study was all registered midwives, excluding community service practitioners allocated in the 13 maternity wards of the district hospitals of the Chris Hani Health District (N=145) in March 2015. However, at the commencement of data collection by March 2016, only 124 midwives were working in the maternity wards (Table 3.1).

**Table 3.1: Midwives population at the Chris Hani District hospitals being studied**

<b>Hospital</b>	<b>Population 2015</b>	<b>Population 2016</b>
All Saints	17	12
Cala	9	10
Cofimvaba	14	12
Cradock	10	9
Dordrecht	9	11
Elliot	10	13
Glen Grey	17	12
Hewu	12	8
Indwe	8	9
Martje Venter	8	7
Molteno	10	9
Sterkstroom	6	6
Wilhelmstahl	6	6
<b>Total</b>	<b>N = 145</b>	<b>N = 124</b>

Due to the relatively small population size, the researcher chose to select the total population of midwives working in maternity wards in the Chris Hani health district hospitals for the administration of the questionnaires (Burns & Grove, 2009: 355).

### **3.5.1 Inclusion criteria**

All permanently employed registered midwives working in maternity wards of the Chris Hani Health District hospitals were eligible to participate in the study.

### **3.5.2 Exclusion criteria**

Community service practitioners working in maternity wards were excluded as they were rotated every 2 – 3 months in all wards.

### 3.6 INSTRUMENTATION

A structured self-administered questionnaire (Appendix 4) was developed specifically to determine the knowledge of basic neonatal resuscitation among midwives at district hospitals. The researcher designed appropriate question items which were intended to measure midwives' understanding of basic neonatal resuscitation with regard to their knowledge as outlined in the WHO Guidelines on Basic Newborn Resuscitation, Perinatal Education Programme – Newborn Care, National Guidelines on basic neonatal resuscitation and the HBB training manual. WHO Guidelines on Basic Newborn Resuscitation has outlined thirteen recommendations classified into immediate care after birth, positive pressure ventilation and stopping resuscitation (WHO, 2012:7-9).

The questionnaire was divided into two sections:

- Section A: Biographical data included gender, age, race, marital status, highest qualifications in midwifery, professional position in the unit/area, service experience of the midwives, training as well as participation in neonatal resuscitation.
- Section B: 22 multiple choice questions and one scenario whereby participants were expected to sketch the sequence of 4 steps in the application of HBB. The knowledge questions were used in evaluating knowledge on the preparation for birth and identification of neonates requiring assistance; including appropriate decisions and actions related to drying, warming, airway clearance, stimulation and bag and mask ventilation techniques during neonatal resuscitation.

The questionnaire was available in English as it is the main language of communication amongst health professionals in the district. The pre-service training of midwives is in English and in-service training is currently conducted in English as well. Therefore the researcher found it feasible to have the questionnaire in English as it refers to scientific concepts that are not easy to translate meaningfully in the local languages. A questionnaire was envisaged to be time-effective when dealing with the bigger sample size of this study, easier to administer and had minimal bias on the part of the researcher in the analysis and interpretation of results. Two experts in the field of midwifery and/or neonatology; one who is also involved in HBB training based at Nelson Mandela Academic Hospital and another who is a Paediatric District Clinical Specialist were used to validate the questionnaire. A statistician was consulted prior to sampling for the study. He played a major role in refining the questionnaire so that it eased data capturing and statistical analysis.

### **3.7 PILOT STUDY**

A pilot study was conducted prior to the main study in December 2015 in one of the Chris Hani District Hospitals with a total of 7 midwives. The pilot data was intended to increase the quality of the research instrument and as such it did not form part of the main findings. The feedback from the midwives in piloting of the questionnaire helped in restructuring the questionnaire to make it more user-friendly and ensured that it could be completed it within the stipulated time frame of 30 minutes. Some grammar mistakes in the question items of the questionnaires were corrected.

The feasibility and rigour of the data collection procedure were investigated and the researcher evaluated whether the fieldworkers obtained informed consent in the correct manner and if they could answer the questions of the participants. Furthermore, data was captured and sent to the statistician for interim analysis. Questionnaires which formed part of the pilot were excluded from further data analysis.

### **3.8 VALIDITY AND RELIABILITY**

The researcher made an effort to ensure that the study meets the criteria for quantitative research with regard to validity and reliability. Furthermore, the study was subjected to the scientific rigour which is fundamental in ensuring that data collection processes and measurements used, met the expected standard.

#### **3.8.1 Validity**

Validity is the measure of the truth or accuracy of a claim, meaning how sensitive and specific the test is to measuring the variable the researcher is interested in. Throughout the study, care was taken that the data collected, instruments used, interpretation of data and recommendations of the study were within acceptable ethical standards and that there were resultant data verification principles and rigorous analysis and testing of data in an attempt to verify its veracity (LoBiondo-Wood & Haber, 2010:286).

##### **3.8.1.1 Content validity**

The questionnaire was based on the knowledge outlined in the literature reviewed. The World Health Organisation (WHO) Recommendations on Basic Newborn Resuscitation, Perinatal Education Programme – Newborn Care and National Guidelines on basic neonatal resuscitation and HBB training were used to establish the extent of midwives' knowledge in the resuscitation of neonates. Two experts were asked to review the relevancy and clarity of each item in the questionnaire. The experts also reviewed whether the knowledge questions included all the relevant critical elements pertaining to basic neonatal resuscitation at birth, as well as the types of knowledge and the level of knowledge.

### **3.8.1.2 Face validity**

To ensure that the instrument measured what it was supposed to measure at face value, the study supervisors and the researcher's colleagues reviewed the questionnaire. The pilot study was further used to ensure face validity.

### **3.8.2 Reliability**

Reliability of a study is based on the consistency of the measure obtained. This is an important aspect in testing and determining the credibility of the study (Burns & Grove, 2009:718- 727). Piloting of the questionnaire with midwives who do not form part of the study was used to test the clarity of the questionnaire and its ability to address pertinent issues regarding the knowledge of the midwives in the resuscitation of neonates. The multiple choice question format used in the questionnaire was not suitable for Cronbach's alpha analysis of reliability (Gliem & Gliem, 2003:88). Test-retest reliability could also not be determined since the participants were likely to improve their knowledge scores when completing the questionnaire for the second time.

## **3.9 DATA COLLECTION**

Prior to the pilot study the researcher trained two fieldworkers who were partly medically orientated and proficient in English and the local language - IsiXhosa, to hand deliver self-administered questionnaires in sealed envelopes to the selected district hospitals, supervise completion and collect at the same time. The fieldworkers were recruited from the Further Education Training College learners doing internship as District Health Information System data capturers at the district office. The permission for making use of the fieldworkers who volunteered was obtained from their immediate supervisors who are the sub-district managers. Furthermore, the fieldworkers were paid a sum of R100.00 per day by the researcher as agreed upon as appreciation for their services, as well as money for lunch and in addition, transport to the district hospitals at the researcher's expense. The fieldworkers helped to supervise completion and collect the consent forms and questionnaires after the researcher had explained the purpose and process of the study to the participants.

Furthermore, they were trained and supervised by the researcher during the pilot study to ensure a consistent data collection process and to strengthen the supervision of questionnaire completion.

Arrangements were made with nursing managers to utilise the in-service training scheduled times during the day and the researcher negotiated with night staff to come earlier at 17:45 so as to finish at 18:45 which is the handing over time. This was to guard against interfering

with service delivery routine as it took approximately 30 minutes to complete the questionnaire. Table 3.2 depicts the number of questionnaires distributed and returned.

**Table 3.2: Summary of the number of questionnaires distributed and returned**

<b>Hospital</b>	<b>Questionnaires Distributed</b>	<b>Questionnaires Returned</b>	<b>Questionnaires Excluded</b>
All Saints	12	10	2
Cala	10	10	
Cofimvaba	12	8	4
Cradock	9	9	
Dordrecht	11	10	1
Elliot	13	13	
Glen Grey	12	12	
Hewu	8	8	
Indwe	9	9	
Molteno	9	9	
Sterkstroom	6	6	
Wilhelmstahl	6	6	
<b>Total</b>	<b>117</b>	<b>110 (94%)</b>	<b>7 (6%)</b>

Data was collected in the 12 district hospitals for three months from the 4<sup>th</sup> of January to the 31<sup>st</sup> of March 2016; as the 13<sup>th</sup> one was used for pilot study in December 2015. The accessible population was only 124. The total number of midwives who completed the questionnaires was 117, which excluded the seven which were used in the pilot. From the 117 returned questionnaires, seven had to be excluded from analysis as four were spoiled and three were returned blank by those midwives who voluntarily decided not to participate in the study. The total number of captured questionnaires for data analysis was 110. The response rate of the participants in completion of the questionnaire was 94%.

### **3.10 DATA ANALYSIS**

Data analysis is a process conducted to reduce, organise and give meaning to the collected data. Quantitative data analysis can be done manually or with the help of a computer program (Grove, Burns & Gray, 2013:46). The analysis of data from quantitative research involves among others descriptive analysis techniques to describe demographics and study variables, as well as statistical techniques to test proposed relationships among variables.

#### **3.10.1 Data preparation**

For the purpose of this research the statistician created a data entry template for entering the data from the questionnaires and the researcher captured data on an Excel worksheet.

The researcher rechecked the capturing of data to determine the accuracy of data captured by checking 10 % against the original questionnaires. STATA (version 3) program was used by a statistician at the Biostatistics Unit Stellenbosch University to analyse the data. Data analysis was conducted with the assistance of a statistician and the study supervisors. Initial descriptive statistics was done to identify any errors in data entry. Further data analysis was based on the knowledge scores of the midwives that was calculated based on their answers to the questionnaires administered.

### **3.10.2 Descriptive statistics**

Descriptive statistics are computed to reveal characteristics of the sample and to describe study variables (Grove *et al.*, 2013:538). Application of descriptive statistics was in the form of data summarised with the use of frequencies and percentages for nominal and ordinal level data and means and standard deviations or medians and interquartile ranges for interval and ratio level data where appropriate.

### **3.10.3 Inferential statistics**

Inferential statistics are statistics designed to allow inference from a sample statistic to a population parameter commonly used to test hypothesis of similarities and differences in subsets of the sample under study (Grove *et al.*, 2013:587). Inferential statistics is, however, concerned with the characteristics of a population and uses sample data to make an inference, or suggestion about the population (Brink, Van der Walt & Van Rensburg 2012:190-192).

Inferential statistics are computed to draw conclusions and make inference about the greater population based on the sample data set. It comprises of two classes, namely parametric and non-parametric statistics. In this study non-parametric statistics were primarily used in order to test for relationships between variables. A nonparametric test requires less restrictive assumptions about the data and can accommodate the analysis of categorical as well as rank data (Brink *et al.*, 2012:191-192). The tests used were Chi-square, independent t-test, Fisher's exact test, Mann-Whitney U test, Kruskal-Wallis equality-of-populations rank test and Pearson's/Spearman's rho.

Chi-square test is used to analyse nominal data to determine significant differences between observed frequencies within the data and frequencies that were expected (Grove *et al.*, 2013:587). On occasion in a comparison of the frequency of observations in a fourfold table the numbers are too small for the Chi-square test and a Fisher's exact test is used (Swinscow & Campbell, 2002:95). This was used for testing association between categorical

variables, such as relationships between the training, qualifications and experience of midwives.

An independent t-test is a parametric analysis technique used to test for significant differences between the means of two independent samples when the data is normally distributed (Grove *et al.*, 2013:581). Mann-Whitney U calculation involves converting the data to ranks, discarding any variance or normality issues associated with the original values (Grove *et al.*, 2013: 582-3).

The t-test or Mann-Whitney U test was used to test differences between subgroups of interest, for example differences in knowledge between males and females, as well as the training whether they attended HBB or not. Due to the small sample size and the fact that knowledge scores were not normally distributed, the Mann-Whitney U non-parametric test was mostly used for analysis.

Kruskal-Wallis equality-of-populations rank test is a nonparametric analysis technique that can accommodate the comparisons of more than two groups (Grove *et al.*, 2013: 586). It is used if the data does not meet the normality assumptions for analysis of variance (ANOVA). These comparisons were done between the midwives' training level, qualifications, experience level and their knowledge score in basic neonatal resuscitation. A correlation coefficient is a descriptive statistic that expresses the magnitude and direction of the association between two variables. Pearson's correlation coefficient is used when both variables are measured on an interval or ratio scale; whereas Spearman's rho is used when both variables are measured on ordinal scales (Brink *et al.*, 2012:188). Pearson's/Spearman's rho was used to correlate two continuous variables like age and knowledge score.

### **3.11 SUMMARY**

Chapter three provides the reader with detailed information regarding the research design and the research methodology. It outlines mechanisms that were put in place to ensure that the research is trustworthy, valid and reliable. Furthermore, the outline involved inclusion criteria, exclusion criteria, the study population and the piloting of the questionnaire, as well as the administration of the questionnaires to the study population. The chapter concluded with the data analysis process.

The next chapter will now focus on detailed data analysis and interpretation of the results of the study.

## CHAPTER 4: RESULTS

### 4.1 INTRODUCTION

Chapter three presented the research design and processes of the research. This chapter provides data analysis and interpretation of the study results and follows the outline of the questionnaire (Appendix 4) used for data collection. The data is predominantly presented in frequency tables and graphs.

Descriptive statistics describe numerical data and can be categorized by the number of variables involved (Neuman, 2006:347). According to Burns and Grove (2009:470), descriptive statistics allow the researcher to organize the data in ways that give meaning, insight and allows a phenomenon to be examined from a variety of angles. Neuman (2006:347) states that a frequency distribution is a table that shows the distribution of cases into the categories of one variable, that is, the number or percentage of cases in each category. Bivariate statistics allow a researcher to describe the relationship between two variables (Neuman, 2006:353).

A confirmatory analysis to test quality of properties across a level of variables was carried out. The Chi-square test was used to test association between categorical variables. For associations between the categorical variables and the knowledge score, the Kruskal Wallis test was used for three or more groups (e.g. qualifications) and the Mann-Whitney U and Pearson's/Spearman's rho if there were two groups (e.g. trained versus not trained).

A p-value of  $p \leq 0.05$  represents statistical significance in hypothesis testing and 95% confidence intervals were used to describe the estimation of unknown parameters. When the p-value is greater than 0.05 by convention chance cannot be excluded and the findings are therefore not statistically significant at that level (Burns & Grove, 2007:325-331).

### 4.2 SECTION A: BIOGRAPHICAL DATA

This section consists of the participants' biographical information and it is formulated into ten questions and the data is presented in tables. The biographical data on the training, qualifications and experience of midwives in neonatal resuscitation was analysed with descriptive statistical analysis. Data presentation includes gender, race, age, marital status, qualifications, professional position held, years of experience of midwives, training in neonatal resuscitation as well as participation in neonatal resuscitation.

#### 4.2.1 Gender

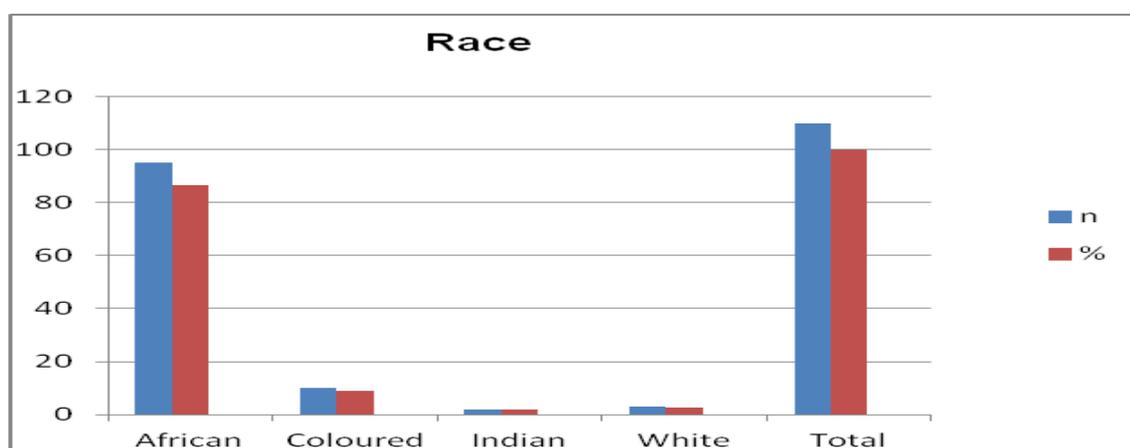
The results illustrated in Table 4.1 indicate that the majority of midwives are females (n= 97; 88.2%) and the minority (n=13; 11.8%) are males. This distribution shows the dominance of females in the profession which is substantiated by Keighley (2009:27), who has acknowledged the female dominance in the nursing profession. This is in keeping with statistics from the South African Nursing Council provincial distribution of nursing manpower. The number of female registered nurses in the Eastern Cape is 13 940 while the number of male registered nurses is 1 452. This means that the majority of registered nurses are female (SANC, 2016: 2-3).

**Table 4.1: Gender (n =110)**

Gender	n	%
Female	97	88.2
Male	13	11.8
<b>Total</b>	<b>110</b>	<b>100</b>

#### 4.2.2 Race

Figure 4.1 shows the race group of midwives as consisting of African (n=95; 86.4%), Coloured (n=10; 9%), Indian (n=2; 1.8%) and White (n=3; 2.7%). As the district is more rural, the majority of nurses are Africans, in keeping with the racial demography of the province and the country since recruitment and equity policies are implemented (SANC, 2016: 5).



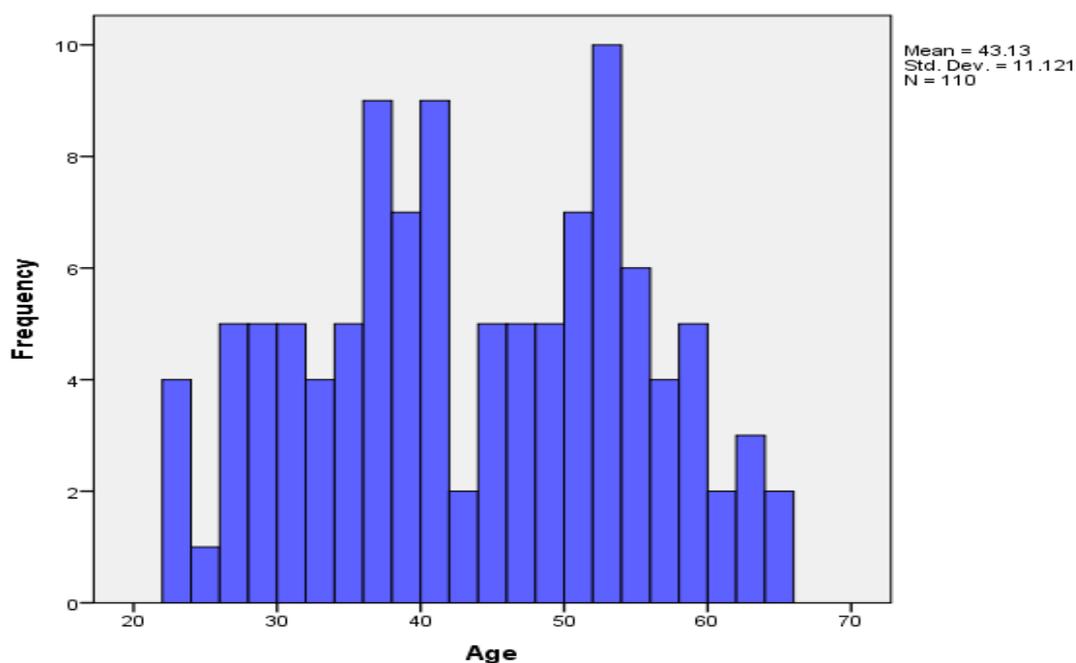
**Figure 4.1: Race group of the participants (n=110)**

#### 4.2.3 Age

Table 4.2 shows the mean age of midwives as 43 years with a standard deviation (SD) of 11.1, the youngest being 23 years of age and the oldest being 64 years of age. The median is 42 years and the interquartile range from 0.25% to 0.75% is 35 – 53 years. The age distribution shows maturity, i.e. midwives are generally older (Figure 4.2).

**Table 4.2: Age (n=110)**

n	Mean	SD	Minimum	25 <sup>th</sup> Percentile	Median	75 <sup>th</sup> Percentile	Maximum
110	43.13	11.12	23.00	35.00	42.00	53.00	64.00

**Figure 4.2: Age (n=110)**

#### 4.2.4 Marital status

Table 4.3 reflects the marital status of participants as follows: single (n=41;37.3%), married (n=45;40.9%), divorced (n=8;7.3%) and widowed (n=16;14.5%). The larger number of participants are married (n=45; 40.9%).

**Table 4.3: Marital status (n=110)**

Marital Status	n	%
Single	41	37.3
Married	45	40.9
Divorced	8	7.3
Widowed	16	14.5
Total	110	100

#### 4.2.5 Qualifications

Table 4.4 reflects that participants had the qualifications in midwifery as follows: those with one year diploma in Midwifery (n=34;30.9%); those with a Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing) (n=32;29.1%);

those with a four year diploma in General Nursing and Midwifery (Psychiatry & Community Health Science (n=27;24.5%); and those with a four year degree in General Nursing and Midwifery (Psychiatry and Community Health Science (n=17;15.5%). The table reflects that almost one third is qualified in Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing) which are the most desired qualification for the midwives to function in a knowledgeable capacity, especially at a district hospital level (SANC,2014:2).

**Table 4.4: Qualifications (n=110)**

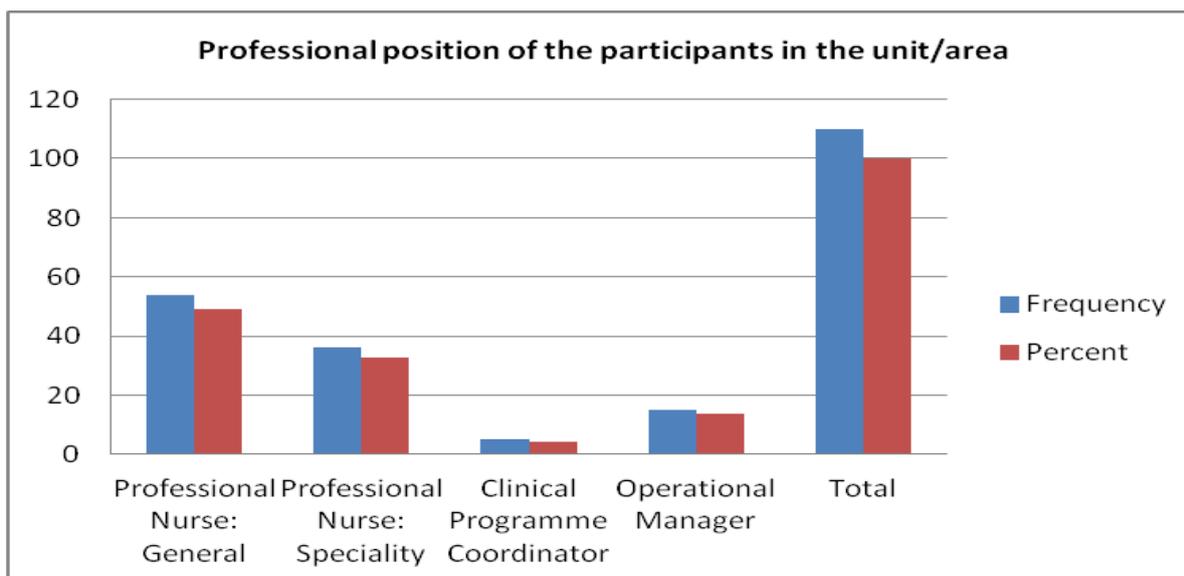
<b>Qualifications</b>	<b>n</b>	<b>%</b>
4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science)	17	15.5
4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	27	24.5
1 year basic diploma in Midwifery	34	30.9
Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing)	32	29.1
Total	110	100

#### **4.2.6 Professional position**

Figure 4.3 shows that the respondents have professional positions as follows: Professional Nurse General (n=54, 49.1%); Professional Nurse Specialty (n=36, 32.7%); Operational Manager (n=15, 13.6%); and Clinical Programme Coordinator (n=5, 4.5%).

An **operational manager's** main job purpose is to provide holistic nursing care to patients in a special unit in a cost effective, efficient and equitable manner. One of the main objectives, which is coordination of optimal, holistic specialised nursing care provided within set standards and a professional / legal framework with a weight of 50% comprises of specific activities. These activities provide a comprehensive, quality nursing care as a member of the multi-disciplinary team according to the identified needs of the patient, based on scientific principles. Operational managers also delegate duties and support staff in the execution of patient care delivery (National Department of Health-OSD 2007: Annexure L).

A **clinical programme coordinator's** main job purpose is to manage and coordinate the activities of the programme; in this case it would be the Maternal and Child Programme. One of the main objectives, is to provide professional and technical support for the provision of quality patient care through proper management of relevant programmes with a weight of 10% comprising of activities amongst others to actively participate in patient care during support visits to the district hospitals (National Department of Health-OSD 2007:Annexure D)



**Figure 4.3: Professional position of the participants in the unit/area (n=110)**

#### 4.2.7 Midwifery experience

Table 4.5 indicates that 83.6% (n=92) of participants have more than 3 years experience which means that the majority of the midwives are well-experienced in midwifery.

**Table 4.5: Midwifery experience of the participants (n=110)**

Midwifery experience		n	%
Valid	Less than 3 years	18	16.4
	3 years – less than 5 years	14	12.7
	5 years – less than 10 years	31	28.2
	More than 10 years	47	42.7
	Total	110	100

#### 4.2.8 Training in neonatal resuscitation

Table 4.6 illustrates that the participants have been trained in Helping Babies Breathe (HBB: n=78, 70.9%), followed by neonatal resuscitation (n=65, 59.1%), Essential Steps in Management of Obstetric and Emergencies (ESMOE: n=43, 39.1%), and least on Paediatric Life Support (n=4, 3.7%) The other five participants indicated that they did other training for example Mother and Baby Friendly Hospital Initiative training (n=5, 4.5%). The higher percentage of midwives trained in HBB could reflect that priority is given to HBB training at a district hospital level.

**Table 4.6: Type of neonatal resuscitation training amongst participants (n=110)**

<b>Training in neonatal resuscitation: HBB</b>		
	<b>n</b>	<b>%</b>
Yes	78	70.9
No	32	29.1
<b>Total</b>	<b>110</b>	<b>100</b>
<b>Training in neonatal resuscitation: ESMOE</b>		
	<b>n</b>	<b>%</b>
Yes	43	39.1
No	67	60.9
<b>Total</b>	<b>110</b>	<b>100.</b>
<b>Training in neonatal resuscitation: Neonatal resuscitation</b>		
	<b>n</b>	<b>%</b>
Yes	65	59.1
No	45	49.9
<b>Total</b>	<b>110</b>	<b>100</b>
<b>Training in neonatal resuscitation: Paediatric life support</b>		
	<b>n</b>	<b>%</b>
Yes	4	3,7
No	106	96.3
<b>Total</b>	<b>110</b>	<b>100</b>

HBB – Helping Babies Breathe

ESMOE – Essential Steps in Management of Obstetric Emergencies

#### **4.2.9 Last training in neonatal resuscitation received**

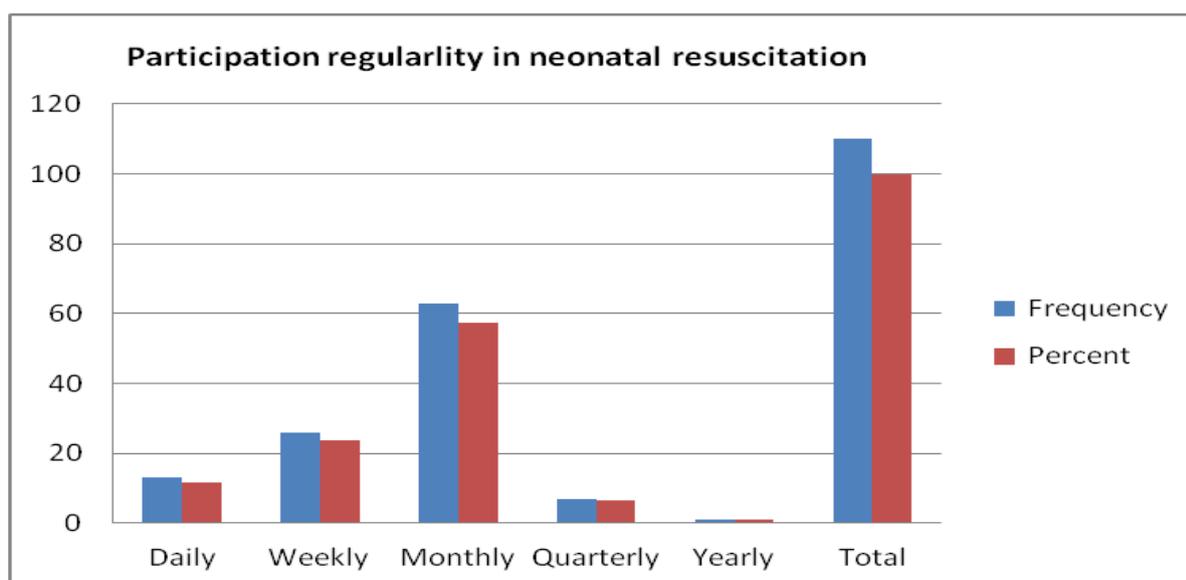
The last dates of training provided by the participants were used to calculate the number of months since the participant last attended the training. Table 4.7 shows that the 78 participants who completed HBB training were last trained between 4 months and 20 months before. On average, participants were trained more than one year before (mean = 15.5 months). Then 65 participants were last trained in Neonatal Resuscitation at the minimum number of 4 months and the maximum of 68 months. Furthermore, 43 participants were last trained in ESMOE at the minimum number of 4 months and the maximum of 68 months. The recent types of training attended were HBB, ESMOE and Neonatal Resuscitation which were the current available types of training that midwives attended more.

**Table 4.7: Last training neonatal resuscitation received in months**

Neonatal Resuscitation Training	n	Min	Max	Mean	Std. Deviation
HBB	78	4	20	15.5	3.9
ESMOE	43	4	34	16.0	11.0
Neonatal Resuscitation	65	4	68	18.0	16.0
Paediatric Life Support	4	48	48	48.0	0.0
Other training (MBFHI)	5	21	70	31.2	21.7

#### 4.2.10 Participation regularity in neonatal resuscitation

Figure 4.4 reflects that most of the midwives participate monthly in neonatal resuscitation practice (n=63, 57%), followed by those who participate weekly (n=26, 24%), those who participate daily (n=13, 12%), those who participate quarterly (n=7, 6.4%) and those who participate yearly (n=1, 1%). This implies that 92.7% (n=102) of midwives do participate in resuscitation frequently (daily, weekly or monthly). It is therefore very important that they have up-to-date knowledge and skills in basic neonatal resuscitation (ICM, 2013:10).

**Figure 4.4 : Participation regularity in neonatal resuscitation**

### 4.3 SECTION B: KNOWLEDGE LEVEL ON BASIC NEONATAL RESUSCITATION

In this section, the knowledge of participants was assessed which included knowledge on preparation for birth and identification of neonates requiring assistance, bag and mask ventilation techniques during neonatal resuscitation and four basic steps to follow on preparation for delivery.

#### **4.3.1 Knowledge scores on preparation for birth and identification of neonates requiring assistance**

This section presents ten questions from 11–20 (see the questionnaire in the appendix). Each question has four options from which participants could choose the most appropriate response; based on the level of knowledge about the preparation for birth and identification of neonates requiring assistance; including appropriate decisions and actions related to drying, warming, airway clearance and stimulation at birth. Participants' responses are summarised in Table 4.8.

Table 4.8 indicates the knowledge of midwives about preparation of a labour room for birth, as well as identification of neonates who might require assistance. Question 11 indicates that the majority (n=72, 65.5%) knew that neonates may need resuscitation at birth by caesarean section under general anaesthesia. This further shows that in question 12 the vast majority of the participants (n=108, 98.2%) chose the correct statement that for one to prepare for a birth of neonates one has to identify a helper and make an emergency plan (American Academy of Paediatrics, 2010:8). Furthermore, in questions 13 and 14 all participants (n=110, 100%) rightfully pointed out that for one to prepare the area, one must make sure that the area is clean, warm and well-lit; as well as keeping the baby clean by washing of hands before touching the baby and helping the mother wash her hands before breastfeeding. This practise is in accordance with infection prevention and control; which is one of the six South Africa Health Ministerial priorities monitored in all health establishments for compliance (National Department of Health, 2011:16).

Question 15 shows that 90.9% (n=100) of participants knew the value of Apgar score which is used to assess the infant's clinical condition at birth; meanwhile in Question 16 more participants (n=103, 94%) correctly indicated that during 'The Golden Minute' the neonate must be helped to breathe if necessary. Apgar scoring is included in basic training of midwifery for all midwives, whereas 'The Golden Minute' training has been introduced in the HBB training which most midwives were trained in.

Question 17 indicates that the majority of participants (n=100; 91%) were in agreement that when the neonate is quiet, limp and not breathing at birth one must dry the baby thoroughly; and in question 18 the majority of participants (n=103; 93.6%) correctly pointed out that when the neonate does not respond to steps to stimulate breathing, one must begin bag and mask ventilation. Furthermore, question 19 reflects that fewer participants (n=66; 60%) know that the neonate who cannot be adequately ventilated with bag and mask needs to be intubated and ventilated. In question 20 the majority of the participants (n=62; 56.4%) were

correct in indicating the recommended rate for ventilating a newborn infant; which is 40 breaths per minute.

**Table 4.8: Preparation for birth and identification of neonates requiring assistance**

Variable	Correct Response		n	%	
Q11	Situation in which to anticipate that the neonate will need to be resuscitated at birth	Caesarean section under general anaesthesia	Correct	72	65.5
			Incorrect	38	34.5
			Total	110	100
Q12	To prepare for a birth	You identify a helper and make an emergency plan	Correct	108	98.2
			Incorrect	2	1.8
			Total	110	100
Q13	To prepare the area for delivery	Make sure the area is clean, warm, and well-lighted	Correct	110	100
			Incorrect	0	0
			Total	110	100
Q14	What to do to keep the baby clean	Wash your hands before touching the baby and help mother wash her hands before breastfeeding	Correct	110	100
			Incorrect	0	0
			Total	110	100
Q15	The value of one minute Apgar Score	It is used to assess the infant's clinical condition at birth.	Correct	100	90.9
			Incorrect	10	9.1
			Total	110	100
Q16	What to do in the Golden Minute	Help a baby breathe if necessary	Correct	103	93.6
			Incorrect	7	6.4
			Total	110	100
Q17	What to do if a baby is quiet, limp and not crying	Dry the baby thoroughly	Correct	100	91
			Incorrect	10	9
			Total	110	100
Q18	What to do if the baby does not respond on to steps of stimulating breathing	Begin ventilation	Correct	103	93.6
			Incorrect	7	8.4
			Total	110	100
Q19	Next step to do if an infant cannot be adequately ventilated with bag and mask	Be intubated and ventilated	Correct	66	60
			Incorrect	44	40
			Total	110	100
Q20	Rates recommended for ventilating a newborn infant	40 breaths per minute	Correct	62	56.4
			Incorrect	48	43.6
			Total	110	100

#### **4.3.2 Knowledge scores on bag and mask ventilation techniques during neonatal resuscitation (True/False statements)**

This section presents twelve questions from 21 – 32. Participants were provided with two statements that determine their knowledge with regard to effective bag and mask ventilation technique during basic neonatal resuscitation within 'The Golden Minute'. They had to circle correct if agreeing or incorrect if disagreeing with the statement.

In Table 4.9 the majority of participants in question 21a (n=110, 100%), in question 21b (n=109, 99.1%) and in question 21c (n=86, 78.2%) were able to show how to indicate correct steps in effective ventilation with bag and mask. However, in question 21d the majority of the participants (n=59, 53.6%) were incorrect in pointing out that during effective ventilation one has to squeeze the bag to produce 80 to 100 breaths per minute.

In question 22, question 22a (n=105, 95.6%) and question 22c (n=107, 97.3%), the majority of participants knew circumstances under which to stop ventilation, whereas the majority of participants in question 22b (n=11, 10%), question 22c (n=10, 9.1%) did not know.

In question 23 the majority of participants (question 23a: n=110, 100%) were able to identify correct answers with regard to knowledge of the neonate heart rate; only a minority of participants (question 23b: n=3, 2.7%) got wrong answers.

With regard to question 24 (n=44, 40%) and question 25 (n=63, 57%) participants show slight knowledge in clamping of the cord, as well as management of meconium-stained amniotic fluid at delivery respectively. The majority of participants reflected higher knowledge in the application of bag and mask ventilation techniques as evident in answering of the following questions: question 26 (n=106, 96%), question 27 (n=108, 98%), question 28 (n=58, 53%), question 30 (n=90, 82%) and question 31 (n=109, 99%). Furthermore, question 29 (n=45, 41%) and question 32 (n=49, 45%) indicate lesser knowledge in initiation of positive-pressure ventilation within a minute as well as when to stop after 10 minutes of effective ventilation. The aforementioned is the current information on HBB training:

**Table 4.9: Knowledge on bag and mask ventilation techniques during neonatal resuscitation**

	<b>Variable</b>	<b>Response Option Provided</b>		<b>n</b>	<b>%</b>
Q21a)	In order to have an effective ventilation with bag and mask	The mask should cover the eyes	True	0	0
			False	110	100
			Total	110	100
Q21b)	In order to have an effective ventilation with bag and mask	Air should escape between the mask and the face	True	1	1
			False	109	99
			Total	110	100.
Q21c)	In order to have an effective ventilation with bag and mask	Squeeze the bag to produce gentle movement of the chest	True	86	78.2
			False	24	21.8
			Total	110	100
Q21d)	In order to have an effective ventilation with bag and mask	Squeeze the bag to produce 80 to 100 breaths per minute	True	59	53.6
			False	51	46
			Total	110	100
Q22a)	You can stop ventilation	Baby is blue and limp	True	5	5
			False	105	95.6
			Total	110	100
Q22b)	You can stop ventilation	Baby's heart rate is 80 per minute	True	11	10
			False	99	90
			Total	110	100
Q22c)	You can stop ventilation	Baby's heart rate is 120 per minute and the chest is not moving	True	10	9.1
			False	100	90.9
			Total	110	100
Q22d)	You can stop ventilation	Baby's heart rate is 120 per minute and the baby is breathing or crying	True	107	97.3
			False	3	2.7
			Total	110	100
Q23a)	A newborn baby's heart rate should be	Faster than your heart rate	True	110	100
			False	0	0
			Total	110	100
Q23b)	A newborn baby's heart rate should be	Slower than your heart rate	True	3	2.7
			False	107	97.3
			Total	110	100
Q24	Clamping of the umbilical cord at birth	In newborn babies who do not require positive-pressure ventilation, the cord should be clamped earlier than one minute after birth.	True	44	40
			False	66	60
			Total	110	100

	<b>Variable</b>	<b>Response Option Provided</b>		<b>n</b>	<b>%</b>
Q25	Intrapartum suctioning in the presence of meconium-stained amniotic fluid	Suctioning of the mouth and nose at the delivery of the head is not recommended	True	47	43
			False	63	57
			Total	110	100
Q26	During ventilation with bag and mask	It is important to select the mask that covers the chin, mouth and nose, but not the eyes.	True	106	96
			False	4	4
			Total	110	100
Q27	An effect of a good seal of the mask	A good seal between the mask and the face allows you to move air into the baby's lungs during ventilation.	True	108	98
			False	2	2
			Total	110	100
Q28	Positioning of the baby's head	To help open the baby's airway, you should position the baby's head hyper extended	True	52	47
			False	58	53
			Total	110	100
Q29	Initiation of positive-pressure ventilation within a minute	In newborn babies who do not start breathing despite thorough drying and additional stimulation, positive-pressure ventilation should be initiated within two minutes after birth.	True	65	59
			False	45	41
			Total	110	100
Q30	What to do with a baby who is gasping or not breathing at all	A baby who is not breathing well (gasping or not breathing at all) needs continued ventilation with bag and mask.	True	90	82
			False	20	18
			Total	110	100
Q31	When to stop ventilation during bag and mask ventilation	If the baby's heart rate is 120 per minute and the baby is breathing or crying	True	109	99
			False	1	1
			Total	110	100
Q32	What should be done with newborn babies with no detectable heart rate after 10 minutes of effective ventilation	Resuscitation should not be stopped.	True	61	55
			False	49	45
			Total	110	100

#### 4.3.2 Knowledge scores on four basic steps to follow on preparation for delivery

This section presents one question (number 33); which comprised of a scenario given to the midwives to determine if they are able to prepare within less than ten minutes for the birth and care of the baby. The participants needed to prioritise four steps in sequence of 1 to 4.

Table 4.10 indicates that the minority of the participants did not know the correct steps to prepare for birth and care of the baby (question 33A: n=36, 33%, question 33B: n= 23, 21%, question 33D: n=41, 37%); with an exception that in question 33 C the majority of the participants were able to identify the correct step (n=66, 60%).

**Table 4.10: Knowledge on 4 basic steps to follow on preparation for delivery**

	<b>Variable</b>	<b>Correct Response</b>		<b>n</b>	<b>%</b>
Q33a)	Scenario: preparation for the birth and care for the baby in less than 10 minutes	Clean hands and maintain clean equipment throughout (Step 3)	Incorrect	74	67
			Correct	36	33
			Total	110	100
Q33b)	Scenario: preparation for the birth and care for the baby in less than 10 minutes	Prepares an area for ventilation and check equipment (Step 4 )	Incorrect	87	79
			Correct	23	21
			Total	110	100
Q33c)	Scenario: preparation for the birth and care for the baby in less than 10 minutes	Identifies a helper and makes an emergency plan (Step 1)	Incorrect	44	40
			Correct	66	60
			Total	110	100
Q33d)	Scenario: preparation for the birth and care for the baby in less than 10 minutes	Prepares the area for delivery (Step 2)	Incorrect	69	63
			Correct	41	37
			Total	110	100

#### 4.4 SECTION C: KNOWLEDGE SCORES

Table 4.11 portrays the total knowledge scores of the participants (n=110) with a minimum of 19, a maximum of 29 and the mean score of 23.8 and standard deviation of 2.4. Figure 4.6 shows the total knowledge score as a percentage with a minimum of 63%, a maximum of 97%, the mean score of 79.3% and standard deviation of 7.8.

**Table 4.11: Knowledge Scores**

	<b>Descriptive Statistics</b>				
	<b>n</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Total knowledge score	110	19	29	23.8	2.4
Total knowledge score %	110	63	97	79.3	7.8

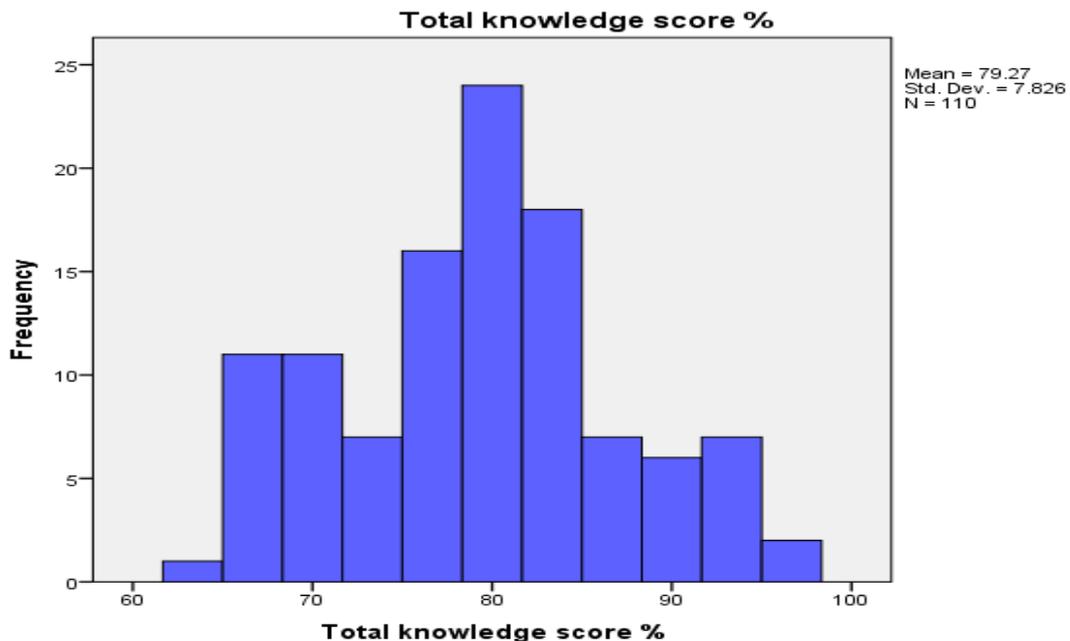


Figure 4.5 : Knowledge Scores

The total knowledge scores of participants were compared across the demographic variable categories. In general the participants' knowledge of basic neonatal resuscitation does not show any significant differences regarding race, gender, marital status and qualifications.

#### 4.4.1 Knowledge score according to gender

Table 4.12 indicates the knowledge score percentage according to gender with the mean score of 79.1% for females and 80.5% for males with the standard deviation of 7.8 for females and 8.0 for males. Males have a slightly higher mean knowledge score percentage compared to females as depicted in Table 4.12. The difference in scores is however not significant (Mann Whitney U,  $p=0.55$ ).

Table 4.12: Knowledge score percentage for gender

What is your gender?	n	Mean	Std. Deviation
Female	97	79.1	7.8
Male	13	80.5	8.0
Total	110	79.3	7.8

#### 4.4.2 Knowledge score according to race

Table 4.13 indicates knowledge score percentage per race group with a mean score of 79.3% for Africans, 78.3% for Coloureds, 76.7% for Indians and 82.2% for Whites with the standard deviation of 7.8 for all race groups. However, the Kruskal-Wallis equality-of-

populations rank test show that there is no significant difference ( $p=0.89$ ) in the scores of the participants with regard to race.

**Table 4.13: Knowledge score percentage for race group**

What is your race group?	n	Mean	Std. Deviation
African	95	79.3	7.8
Coloured	10	78.3	7.4
Indian	2	76.7	9.4
White	3	82.2	11.7
Total	110	79.3	7.8

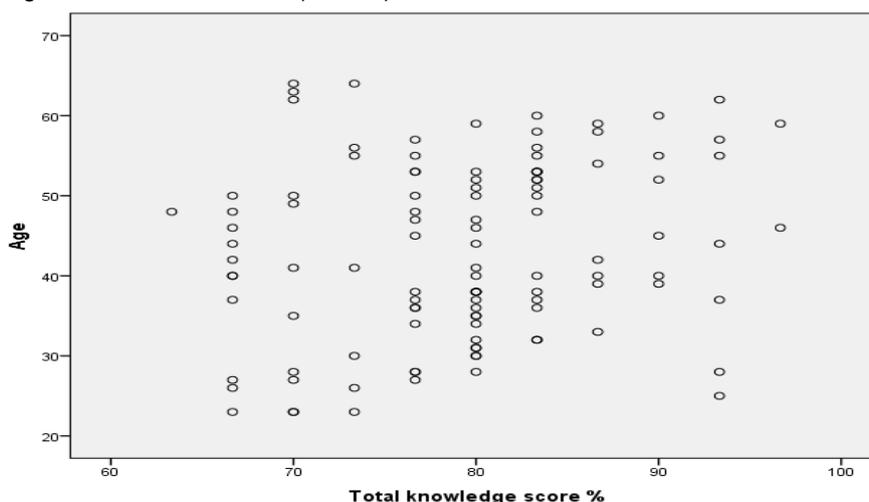
#### 4.4.3 Knowledge score according to age

Table 4.14 shows that the bivariate correlation between the participants' age and the total knowledge score percentage show a significant correlation (Spearman's rho = 0.22,  $p = 0.02$ ). However, p-value of below 0.5 indicates that this correlation may not be clinically significant. In addition, the scatter plot in Figure 4.6 does not show a clear relationship between age and knowledge.

**Table 4.14: Knowledge score for age**

		Correlations		
			Age	Total knowledge score %
Spearman's rho	Age	Correlation Coefficient	1.000	.222*
		Sig. (2-tailed)	.	.02
		n	110	110

\*. Correlation is significant at the 0.05 level (2-tailed).



**Figure 4.6 : Knowledge score for age**

#### 4.4.4 Knowledge score according to marital status

Table 4.15 shows the mean score percentage of 78.0% for single, 78.4% for married and 81.2% for divorced and 83.7% for widowed with the standard deviation of 7.8 for total marital status of participants. The Kruskal-Wallis test shows no significant difference on scores ( $p=0.58$ ) with regard to marital status.

**Table 4.15: Knowledge score percentage for marital status**

Indicate your marital status	N	Mean	Std. Deviation
Single	41	78.0	7.3
Married	45	78.4	7.8
Divorced	8	81.2	10.1
Widowed	16	83.7	7.1
Total	110	79.3	7.8

#### 4.4.5 Knowledge score according to qualifications in midwifery

Table 4.16 indicates a mean score percentage of 76.7% for the 4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science); 78.8% for the 4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science); 79.4% for the 1 year basic diploma in Midwifery and 80.9% for the Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing) with the overall standard deviation of 7.8. Kruskal-Wallis equality-of-populations rank test shows that the distribution of total score percentage is the same across categories of qualifications in midwifery ( $p=0.3$ ).

**Table 4.16: Knowledge score percentage for highest qualification in midwifery**

Indicate your highest qualification in midwifery	n	Mean	Std. Deviation
4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science)	17	76.7	8.1
4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	27	78.8	7.6
1 year basic diploma in Midwifery	34	79.4	7.5
Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing)	32	80.9	8.1
Total	110	79.3	7.8

#### 4.4.6 Knowledge score according to professional position in the unit /area

Table 4.17 shows that Clinical Programme Coordinators have a high mean knowledge score percentage of 85.0%. This may be due to the fact that they are responsible for supportive supervision and mentoring of midwives. However, the Kruskal-Wallis equality-of-populations rank test does not indicate any significant difference between the groups ( $p=0.13$ )

**Table 4.17: Knowledge score percentage for professional position**

Professional position in the unit /area	n	Mean	Std. Deviation
Professional Nurse: General	54	78.0	8.0
Professional Nurse: Speciality	36	79.2	6.6
Clinical Programme Coordinator	5	85.0	9.9
Operational Manager	15	82.2	8.4
Total	110	79.2	7.8

#### 4.4.7 Knowledge score according to experience practicing as a midwife

Table 4.18 shows scores and means among the participants regarding their experience in practising as midwives. The Kruskal-Wallis equality-of-populations test shows a significant difference between the groups ( $p = 0.006$ ). It is possible that as the midwives gain experience in terms of service in their work, their knowledge increases.

**Table 4.18: Years of experience practising as a midwife**

Years of experience practising as a midwife?	n	Mean	Std. Deviation
Less than 3 years	18	75.4	6.5
3 years – less than 5 years	14	77.1	8.8
5 years – 10 years	31	78.3	8.2
More than 10 years	47	82.1	6.9
Total	110	79.3	7.8

#### 4.4.8 Knowledge score according to training in neonatal resuscitation: HBB

Figure 4.7 is a box and whisker plot of the distribution of scores in the two groups; the trained (YES) and not trained (NO) in HBB. This shows medians and the interquartile range. The wider interquartile range in the 'No' group indicates that there were fewer participants ( $n=32$ ) not trained compared to more participants ( $n=78$ ) trained in HBB. The mean score is 79.3 and the standard deviation is 7.8. The difference in knowledge scores is not significant (Mann-Whitney U,  $p=0.29$ ). This implies that the participants trained in neonatal resuscitation: HBB did not have significantly higher knowledge scores compared to those without neonatal resuscitation: HBB training.

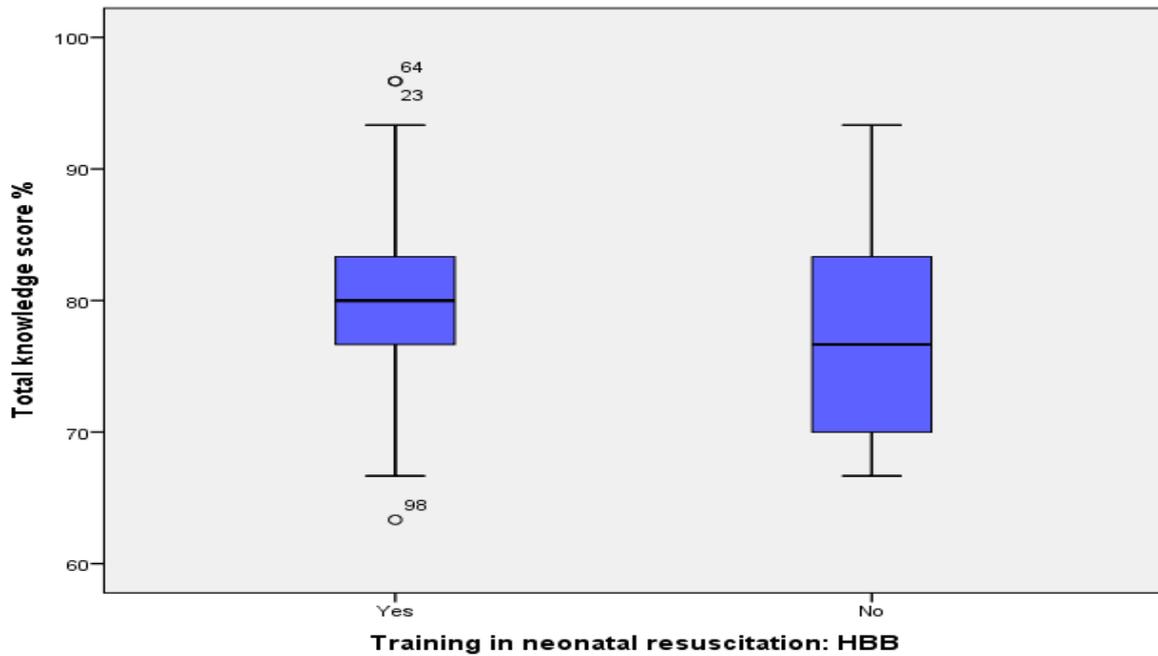


Figure 4.7: Training in neonatal resuscitation: HBB

#### 4.4.9 Knowledge score according to training in neonatal resuscitation: ESMOE

Figure 4.8 shows a box and whisker plot of the distribution of scores in the two groups; the trained (YES) and not trained (NO) in ESMOE. This shows medians and the interquartile range. The mean score is 79.3 and the standard deviation is 7.8. The difference in knowledge scores is not significant (Mann-Whitney U,  $p=0.02$ ). This implies that the participants trained in neonatal resuscitation (ESMOE) did not score better than those without neonatal resuscitation i. e. ESMOE training.

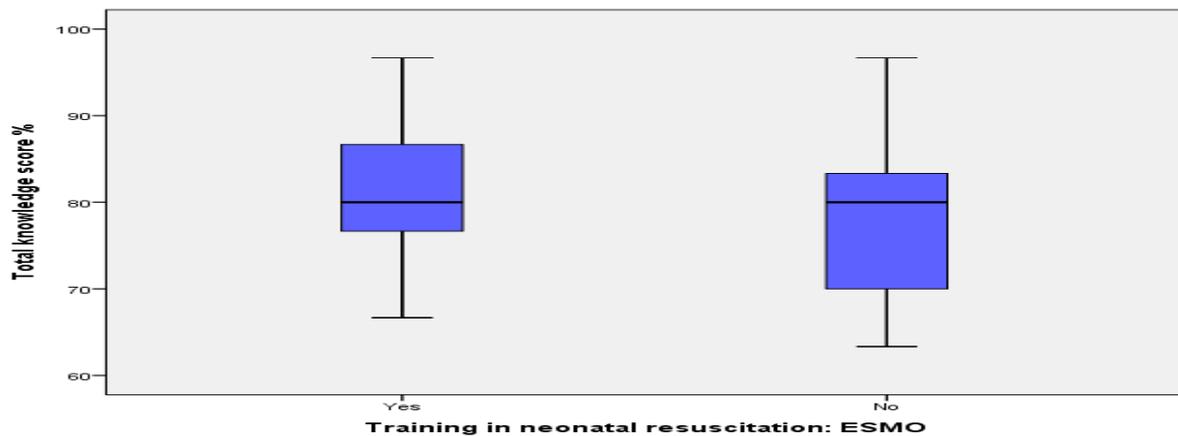


Figure 4.8: Training in neonatal resuscitation: ESMOE

#### 4.4.10 Knowledge score according to training in neonatal resuscitation: Neonatal Resuscitation

Figure 4.9 shows a box and whisker plot of the distribution of scores in the two groups; the (YES) trained and the (NO) not trained in Neonatal Resuscitation. This shows medians and the interquartile range. The mean score is 79.3 and the standard deviation is 7.8. The difference in knowledge scores is not significant (Mann-Whitney U,  $p = 0.42$ ). This implies that the participants trained in neonatal resuscitation did not score better than those without Neonatal Resuscitation training.

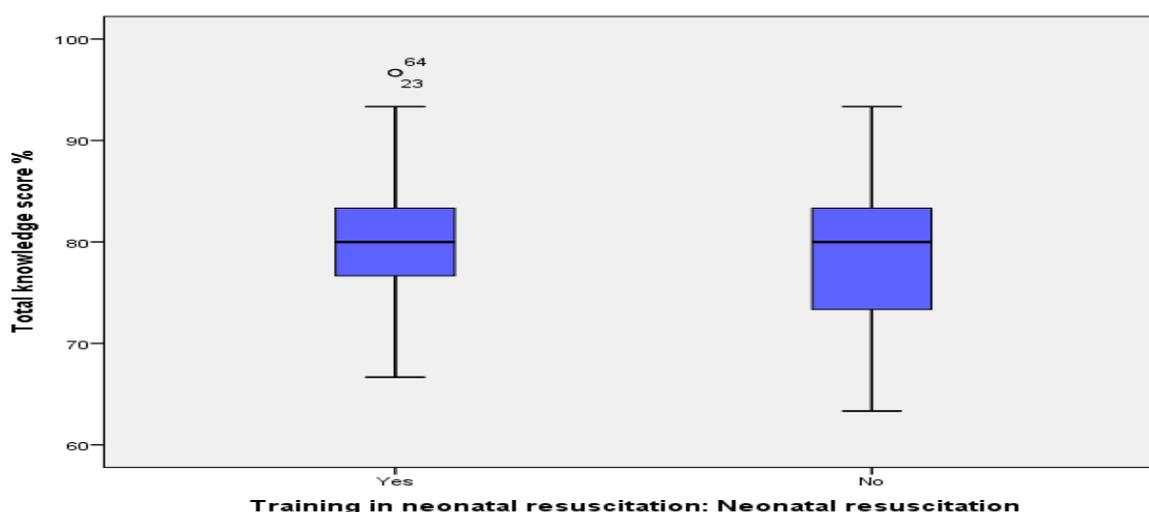


Figure 4.9: Training in neonatal resuscitation: Neonatal Resuscitation

#### 4.4.11 Knowledge score according to training in neonatal resuscitation: Paediatric Life Support

Table 4.19 shows the mean percentage for participants trained in Paediatric Life Support is 84.2% (SD 4.2) compared to 79.1% (SD 7.9) for participants not trained in Paediatric Life Support. The overall standard deviation is 7.8. The significance level is 0.05. The difference in knowledge scores is not significant (Mann-Whitney U,  $p = 0.14$ ). This implies that the participants trained in paediatric life support did not score better in knowledge score than those without Paediatric Life Support training.

Table 4.19: Percentage of training in neonatal resuscitation: Paediatric Life Support

Paediatric Life Support	n	Mean	Std. Deviation
Yes	4	84.2	4.2
No	104	79.1	7.9
Total	108	79.3	7.8

#### 4.4.12 Knowledge score according to training in neonatal resuscitation: other training (MBFHI)

Table 4.20 shows the mean percentage score for participants trained in categories of other training was 77.3% (SD 6.8) compared to 79.4% (SD 8.0) for participants not trained in categories of other training. The overall standard deviation is 7.8. The difference in knowledge scores is however not significant (Mann-Whitney U,  $p = 0.72$ ). This implies that the participants trained in MBFHI did not score better than those without MBFHI training; though it is difficult to compare the groups due to the small number of participants trained.

**Table 4.20: Percentage of training in neonatal resuscitation: other training (MBFHI)**

Other training (MBFHI)	n	Mean	Std. Deviation
Yes	5	77.3	6.8
No	102	79.4	8.0
Total	107	79.3	8.0

#### 4.4.13 Knowledge score according to participation in neonatal resuscitation

Table 4.21 shows mean knowledge score percentage for participants daily participating in neonatal resuscitation was 76.9% (SD 6.0) compared to 73.3% for one participant participating yearly in neonatal resuscitation. Kruskal-Wallis equality-of-populations rank test shows no significance ( $p = 0.31$ ). This indicates that participating in neonatal resuscitation did not have a significant influence on the knowledge score of participants.

**Table 4.21: Percentage of participation in a neonatal resuscitation**

Participation in a neonatal resuscitation	n	Mean	Std. Deviation
Daily	13	76.9	6.0
Weekly	26	78.1	7.4
Monthly	63	79.9	8.3
Quarterly	7	83.3	7.2
Yearly	1	73.3	.
Total	110	79.3	7.8

#### 4.4.14 Knowledge score according to last participation in a neonatal resuscitation

Table 4.22 shows the mean knowledge score percentage for participants who participated within the past week in neonatal resuscitation was 80.4% (SD 6.8) compared to 70.7% (SD 1.5) for participants who participated within the past year in neonatal resuscitation. Kruskal-Wallis equality-of-populations rank test shows no significance ( $p = 0.14$ ) among the participants regarding the last time when she/he participated in neonatal resuscitation. This

indicates that the specific time when the participants last participated in neonatal resuscitation did not significantly influence their knowledge score.

**Table 4.22: Percentage of last participation in a neonatal resuscitation**

<b>Last time you participated in a neonatal resuscitation?</b>	<b>n</b>	<b>Mean</b>	<b>Std. Deviation</b>
Within the past week	33	80.4	6.8
Within the past month	54	79.4	7.8
Within the past 3 months	16	79.4	10.1
Within the past 6 months	2	78.3	2.4
Within the past year	5	70.7	1.5
Total	110	79.3	7.8

#### **4.5 SECTION D: RELATIONSHIP BETWEEN MIDWIVES' QUALIFICATIONS, EXPERIENCE AND TRAINING**

This section deals with the relationship between qualifications, experience and training of the participants as tabulated below. It is important to do these comparisons based on the conceptual framework for this research study constructed on literature of the grounded theory of knowledge management (Jennex, 2008:33) and the theory of Dr Patricia Benner on the levels of nursing experience (Benner, 2013:402-7). It is assumed that as a midwife qualifies from novice, more experience can be gained; as one is exposed to more training, one's knowledge improves and one can become an expert.

##### **4.5.1 Qualifications versus Experience**

Table 4.23 shows a cross tabulation of participants' experience and their highest qualification in midwifery. It shows that 44.7% (n=21) of midwives with more than 10 years' experience had a qualification in Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery). This may indicate that midwives who worked for longer in midwifery are more likely to have been sent for training. Those with less than 3 years' experience were more likely to be trained only with the 4 year diploma or degree. There is a significant association between the variables: highest qualification and years' experience practicing as a midwife (Fisher's Exact,  $p < 0.001$ ).

**Table 4.23: Highest qualification in midwifery according to years of experience practising as a midwife**

Highest qualification in midwifery practising	Years of experience	Indicate how many years of experience practising as a midwife?				Total
		1 (<3 yrs)	2 (3 yrs<5yrs)	3 (5 yrs – 10yrs)	4 (>10yrs)	
4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	9	1	5	2	17
	% within Indicate how many years of experience practising as a midwife?	50.0%	7.1%	16.1%	4.3%	15.5%
4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	8	9	6	4	27
	% within Indicate how many years of experience practising as a midwife?	44.4%	64.3%	19.4%	8.5%	24.5%
1 year basic diploma in Midwifery	Count	1	1	12	20	34
	% within Indicate how many years of experience practising as a midwife?	5.6%	7.1%	38.7%	42.6%	30.9%
Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery)	Count	0	3	8	21	32
	% within Indicate how many years of experience practising as a midwife?	0.0%	21.4%	25.8%	44.7%	29.1%
Total	Count	18	14	31	47	110
	% within Indicate how many years of experience practising as a midwife?	100.0%	100.0%	100.0%	100.0%	100.0%

#### 4.5.2 Qualifications vs Training in neonatal resuscitation: HBB

Table 4.24 shows a cross-tabulation of a significant association between the variables: highest qualification and whether HBB training was received or not ( $X^2$  12.49 [df = 3],  $p = 0.006$ ). Midwives with the one year Basic Diploma in Midwifery constitute the highest percentage of nurses trained in HBB.

**Table 4.24: Highest qualification in midwifery according to training in neonatal resuscitation: HBB**

			Training in NR: HBB		
			Yes	No	Total
Indicate your highest qualification in midwifery	4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	9	8	17
		% within Training in neonatal resuscitation: HBB	11.5%	25.0%	15.5%
	4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	14	13	27
		% within Training in neonatal resuscitation: HBB	17.9%	40.6%	24.5%
	1 year Basic diploma in Midwifery	Count	29	5	34
		% within Training in neonatal resuscitation: HBB	37.2%	15.6%	30.9%
	Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery)	Count	26	6	32
		% within Training in neonatal resuscitation: HBB	33.3%	18.8%	29.1%
Total		Count	78	32	110
		% within Training in neonatal resuscitation: HBB	100.0%	100.0%	100.0%

NR = Neonatal Resuscitation; HBB = Helping Babies Breathe

#### 4.5.3 Qualifications vs training in neonatal resuscitation: ESMOE

Table 4.25 shows a cross-tabulation of a significant association between the variables highest qualification and whether ESMOE training was received or not ( $X^2$  8.37 [df = 3],  $p = 0.039$ ). Midwives with the one year basic diploma in Midwifery constitute the highest percentage of nurses trained in ESMOE.

**Table 4.25: Highest qualification in midwifery according to training in neonatal resuscitation:  
ESMOE**

		Training in neonatal resuscitation: ESMO			
		Yes	No	Total	
Indicate your highest qualification in midwifery	4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	5	12	17
	% within Training in neonatal resuscitation: ESMO	11.6%	17.9%	15.5%	
	4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	7	20	27
	% within Training in neonatal resuscitation: ESMO	16.3%	29.9%	24.5%	
	1 year basic diploma in Midwifery	Count	12	22	34
	% within Training in neonatal resuscitation: ESMO	27.9%	32.8%	30.9%	
	Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery)	Count	19	13	32
	% within Training in neonatal resuscitation: ESMO	44.2%	19.4%	29.1%	
Total	Count	43	67	110	
	% within Training in neonatal resuscitation: ESMO	100.0%	100.0%	100.0%	

ESMOE = Essential Steps in Management of Obstetric Emergencies

#### 4.5.4 Qualifications vs training in neonatal resuscitation: Neonatal Resuscitation

Table 4.26 shows a cross-tabulation that there is a significant association between the variables highest qualification and whether Neonatal Resuscitation training was received or not ( $X^2$  23.12 [df = 3],  $p < 0.001$ ). Midwives with the Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing Science) constitute the highest percentage of participants trained in Neonatal Resuscitation.

**Table 4.26: Highest qualification in midwifery according to training in neonatal resuscitation:  
Neonatal Resuscitation**

		Training in neonatal resuscitation: Neon Resus		Total	
		Yes	No		
Indicate your highest qualification in midwifery	4 year degree in General Count	5	12	17	
	Nursing and Midwifery (Psychiatry & Community Health Science)	% within Training in neonatal resuscitation: Neonatal resuscitation	7.7%	26.7%	15.5%
	4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	Count	11	16	27
		% within Training in neonatal resuscitation: Neonatal resuscitation	16.9%	35.6%	24.5%
	1 year basic diploma in Midwifery	Count	20	14	34
	% within Training in neonatal resuscitation: Neonatal resuscitation	30.8%	31.1%	30.9%	
	Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing Science)	Count	29	3	32
		% within Training in neonatal resuscitation: Neonatal resuscitation	44.6%	6.7%	29.1%
Total	Count	65	45	110	
		% within Training in neonatal resuscitation: Neonatal resuscitation	100.0%	100.0%	100.0%

The paediatric life support and other training numbers were too low to do comparisons.

#### 4.6 SUMMARY

In this chapter data that was collected during this study was presented and interpreted. Tables and graphs were used to visually represent the data. The researcher succeeded in exploring the research objectives and successfully addressed the research question.

In chapter 5 further discussion about the key results, conclusions and recommendations of the specific objectives follow.

## **CHAPTER 5:**

# **DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 INTRODUCTION**

This chapter presents the discussion, conclusion and recommendations based on the data which has been presented in the previous chapter. Emphasis is laid on whether the research objectives of this study have been achieved or not and the recommendations based on the research results and the literature review.

### **5.2 DISCUSSION**

The aim of the study was to determine the knowledge level of registered midwives on basic neonatal resuscitation in the Chris Hani Health District Hospital, Eastern Cape. The overall analysis of the statistical data of the knowledge of the midwives reveals that the majority of the participants are knowledgeable on basic neonatal resuscitation as indicated in chapter 4. The discussion that follows is focused on the findings of each objective of the study.

#### **5.2.1 Objective 1: To identify the qualifications, training and experience of midwives in basic neonatal resuscitation**

##### **5.2.1.1 *Qualifications***

In general, the study revealed that the midwives in the Chris Hani District Hospitals were well qualified in midwifery. The South African Nursing Council, scope of practice of a midwife among others involves professional growth in improvement of midwifery and neonatal care practice. Basic neonatal resuscitation is part of neonatal care practice (Nursing Act, 2013:14).

The mean knowledge score percentages of different categories of midwives as discussed in chapter 4 shows the highest score of 80.9% obtained by participants qualified in Post Basic Diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery and Neonatal Nursing) as well as the lowest score of 76.7% obtained by participants qualified in the 4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science). All these knowledge score percentages suggest similar knowledge across all the categories of qualification in midwifery; though neonatal resuscitation competencies of participants who are qualified in Post Basic Diploma in Midwifery (Advanced Midwifery) and Neonatal Nursing Science are more advanced than in Basic Midwifery qualifications. An advanced midwife is expected to be competent in progressing to endotracheal intubation with oxygen ventilation and insertion of an intravenous infusion (Davidson, London & Ladewig, 2008:1165). The

knowledge depth of the midwives can be developed by the acquisition of Advanced Midwifery and Neonatal Nursing qualifications. This will help to integrate the manner in which the midwives match their knowledge on neonatal resuscitation with practice according to neonatal resuscitation guidelines, as well as the international approach to set standards for qualifications of midwives. These nursing qualifications are instrumental in delineating the content of the neonatal care practice (South African Nursing Council, 2005:18; Keighley, 2009:5-24; WHO, 2012:7-9).

In Benin, Equador, Jamaica and Rwanda, a study was undertaken to assess healthcare professionals, including medical residents and interns, as well as midwives for competence in five maternal and neonatal mortality settings, inter alia knowledge in immediate newborn care and neonatal resuscitation with ambu-bag skills. In immediate newborn care knowledge tests, midwives scored 59% and 52.7% in neonatal resuscitation with ambu-bag skills, meanwhile doctors scored 57.8% and 52.2% respectively; which were far less than the current study knowledge scores. The recommendations of the studies included the development and implementation of an eight-session training programme focused on improving neonatal resuscitation, as well as obstetric complications management; which was then adopted by midwifery colleges and universities and integrated into their pre-service curricula. This further makes a strong case for closing the wide gap between current evidence-based standards and midwives' competence to manage selected neonatal complications (Harvey *et al.*, 2007:788). The International Confederation of Midwives (ICM) further endorses basic midwifery competency with reference to neonatal resuscitation which involves essential elements like preparation for labour and birth, emergency preparedness; beginning of emergency measures for respiratory distress; that is, neonatal resuscitation; suctioning in case of airway obstruction, as well as managing hypothermia and hypoglycaemia (ICM, 2013:1-19).

#### **5.2.1.2 Training**

The importance of training for midwives which enables them to carry out their duties with efficiency and effectiveness cannot be over-emphasised (De Jong & Ferguson-Hessler, 2010:106-1070). This study indicated that the midwives had a relatively high level of training in three essential neonatal resuscitation courses (Table 4.6). On further data analysis the study showed that only 9% (n=10) of participants did not receive any neonatal resuscitation training. This provides evidence of the district's prioritisation on training. These results gave the magnitude of the neonatal resuscitation knowledge gap between the neonatal resuscitation trained and neonatal resuscitation not trained health practitioners in this domain. However, these courses may have similar content, thus even if the midwives were

not trained in HBB, they may have been trained in ESMO. Therefore, the difference in knowledge scores between participants trained and those not trained in any particular course is not marked. The picture was almost similar to the one in other settings in developing countries. Working on neonatal asphyxia, Sidibe et al. (2006:272-276) revealed the importance of training health workers who work in a delivery room.

Furthermore, this study indicated (Table 4.7) that on average, most participants were last trained more than one year ago in HBB followed by Neonatal Resuscitation and ESMOE's last training from 4 to 68 months and 4 to 34 months respectively. This indicates that most midwives were trained in HBB which is basic neonatal resuscitation. A study review on neonatal resuscitation training frequencies, recommended that training be recurrent and considered more frequently than once per year as compared to previous studies of a two-yearly interval (Perlman, Wyllie, Kattwinkel, Wyckoff, Aziz, Guinsburg, Kim, Liley, Mildenhall, Simon, Szyld, Tamura & Velaphi, 2015:S232).

In addition, another study that corroborates the importance of neonatal resuscitation knowledge conducted in the Republic of Bulgaria aimed at reducing the neonatal mortality rate due to intrapartum and perinatal asphyxia and their consequences. This was achieved by providing delivery rooms with neonatal resuscitation equipment, providing midwives, obstetricians and neonatologists, each with a handbook with the guidelines of the neonatal resuscitation. Two training seminars for resuscitation of the newborn were carried out in each of the aforementioned categories and thus improving their expertise. Their training was similar to HBB in this study. There was a small reduction in the neonatal mortality rate due to asphyxia from 9% in 2001 to 8% in 2003; that could have been attributed to the intervention (Vakrilova et al., 2004: 35-40).

### **5.2.1.3 Experience**

This study indicated that the majority of midwives were well-experienced in midwifery (Table 4.5). Nurses with more experience may feel more secured and work with insight (Baiden et al., 2006:532).

According to Benner (2013:402-7), it is possible that as the midwives gain experience in terms of service in their work, their knowledge increases. Hence one finds a significant knowledge score difference between the groups of midwives practising for less than 3 years, 3 to less than 5 years, 5 to 10 years and more than 10 years ( $p=0.006$ ) in Table 4.18. Although the results indicate that specifically the time when the participants last participated in neonatal resuscitation did not have an influence on their knowledge score.

On assessing the regularity in participation in neonatal resuscitation, it was noted that most midwives participated monthly in a neonatal resuscitation, with 80.4% of midwives participating in neonatal resuscitation within the last week. These aforementioned results did not significantly influence their knowledge scores. This might suggest that how regular one participates in neonatal resuscitation does not influence knowledge gained. According to the research of Bennet and Bennet (2004:1) into knowledge, it established that there is a correlation between knowledge and corresponding levels of learning and action. The participants might have lacked conceptual knowledge which is necessary for them to draw distinctions in the applications of different concepts, hence there was no correlation between participation in neonatal resuscitation and knowledge, which is something that needs to be explored further (De Jong & Ferguson-Hessler, 2010:106-7).

## **5.2.2 Objective 2: To determine the knowledge level of midwives on basic neonatal resuscitation at birth**

Various studies have emphasised the importance of knowledge of neonatal resuscitation as a prerequisite in taking action against neonatal mortality (De Jong & *Ferguson-Hessler*, 2010:10-319). In this objective the knowledge level of midwives on basic neonatal resuscitation will be discussed. Important aspects of neonatal resuscitation were chosen to distinguish between the knowledge areas, such as planning and preparation for a successful resuscitation in the delivery room by the midwife and the team; anticipating a mother at risk to give birth to a neonate who will need resuscitation; identifying a non-breathing neonate who may require assistance, as well as outlining the steps of actions to be taken during resuscitation in sequence (Raghuvveer & Cox, 2011:911-918).

### **5.2.2.1 Knowledge on preparation for birth and identification of neonates requiring assistance**

The study determined a range between 56.4% and 100% of the item knowledge scores regarding preparation of a labour room for birth and a mean score of 84.9% (Table 4.8). HBB guidelines advocate a minimum acceptable knowledge overall score of 80% (American Academy of Paediatrics, 2011:23-25). Here a few questions that would impact on practices will be isolated: Only 62 participants (56.4%) obtained a correct score for the question with reference to the ventilation rate of a newborn infant. This is worrisome; as resuscitating a neonate with an incorrect ventilation rate would result in ineffective ventilation and thus poor resuscitation results. Meanwhile 66 participants (60%) obtained a correct score from the question of identifying intubation as the next required step following inadequate ventilation with a bag and mask; this delay in practice may lead to asphyxia and resulting hypoxia that could result in brain damage of the neonate. In addition, 72 participants (65%) obtained a

correct score in identification of neonates who might require assistance is below the expected knowledge level as this is basic information in neonatal resuscitation guidelines for every birth attendant including midwives.

Practically these results mean that midwives may lack the knowledge to identify a neonate requiring resuscitation (NDoH, 2014:24). The literature recommends that accurate identification of risk factors and anticipation at the birth of a high-risk neonate would result in adequate preparation and prompt resuscitation of neonates who need some level of intervention and thus, reducing neonatal morbidity and mortality (Afjeh, Sabzehei & Esmaili, 2013: 675-680).

#### **5.2.2.2 Knowledge on bag and mask ventilation techniques during neonatal resuscitation**

The midwives were able to express their knowledge with regard to effective bag and mask ventilation technique during basic neonatal resuscitation within 'The Golden Minute'; which is critical in the morbidity and mortality outcomes of neonates. The majority of participants indicated the correct steps in effective ventilation with bag and mask in question 21a (n=110, 100%), in question 21b (n=109, 99.1%) and in question 21c (n=86, 78.2%).

The knowledge scores for the individual items in this section ranged between 41% and 100%. About 59% of midwives did not know that initiation of positive-pressure ventilation is within a minute. Meanwhile, 40% of midwives did not know about the delay for 1-3 minutes in clamping of the umbilical cord for neonates who do not require positive-pressure ventilation at birth. Furthermore, they were not knowledgeable on latest information on routine intrapartum suctioning in the presence of meconium-stained amniotic fluid, which is no longer recommended. In addition, they did not have knowledge on mastering effective ventilation with bag and mask by squeezing the bag in acceptable 40 breaths per minute to produce gentle respiratory movement of the chest. The implication here is that some of the midwives did not have up-to-date knowledge regarding best practice in basic neonatal resuscitation. This is made evident through the concept of delaying cord clamping, which is a relatively new practice (Flatman, 2015:6-26).

#### **5.2.2.3 Knowledge on four basic steps to follow on preparation for delivery**

The study indicated (Table 4:10) on average of all resuscitation steps, 62% of the midwives did not know the correct steps to prepare for birth and immediate care of the neonate thereof; 38% were able to identify the correct steps.

The knowledge scores in this section ranged between 21% and 60%. Steps 1 to 4 were obtained correct by the following participants in percentages: 60%, 37%, 33% and 21%, respectively. The implication of this is that more midwives did not know how to prioritise the preparation for birth in the delivery room, especially in cases of emergency, potentially leading to failed neonatal resuscitation with consequences like neonatal morbidity and mortality. This was in line with the findings in Pakistan where healthcare providers, including midwives performed poorly on resuscitation of neonates and only 50% were able to demonstrate steps of immediate newborn care (Ariff *et al.*, 2010:10-319). The study conducted by Gebreegziabher *et al.*, (2014:192-202) on knowledge of midwives underscore the acquisition of knowledge in neonatal resuscitation as key in stemming neonatal mortality. Furthermore, neonatal resuscitation knowledge and skills were found to be inadequate in another study of 192 healthcare providers in Kenya (Monebenimp *et al.*, 2012; 11-78).

#### **5.2.2.4 Overall knowledge scores**

Generally, the study revealed that midwives in the Chris Hani District Hospitals had the necessary knowledge in neonatal resuscitation. The total knowledge score (Table 4.11) percentage had a minimum of 63%, maximum of 97% and the mean score of 79.3% with a standard deviation of 7.8.

However, the average knowledge score of 79.3% is very close to the acceptable knowledge level score of 80% according to the Neonatal Resuscitation Guidelines by the WHO, the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, as well as Perinatal Education Programme Guidelines (Woods, 2014:14).

In accordance with the theory of Benner (2013:402-7) it is necessary for the individual, such as a midwife to progress from a lower level of knowledge to the higher hence the beginner, intermediate and advanced level of knowledge with regard to neonatal resuscitation. The knowledge scores of the midwives in this study serve as a reflection that their knowledge acquisition increases exponentially as they gain experience, engage in further study and on-going training on neonatal resuscitation.

With regard to neonatal resuscitation, it is evident in the study that midwives gain competence in their work as they become more qualified and more experienced. However, one cannot discount the fact that more needs to be done for midwives to become more knowledgeable in dealing with neonatal resuscitation. Different approaches, especially those that have been established to be effective through recent research need to be implemented. This is supported by the study done in South Africa on making maternal and child health

work. In this study midwives' knowledge on neonatal resuscitation were assessed among other interventions, including providing knowledge and skills training on neonatal resuscitation, which was part of a national training agenda at the time and they scored 35% and 50% on pre and post interventions respectively (Thomas, Jina, San Tint & Fonn, 2007:43).

The literature review in this study has underscored the importance of knowledge, experience, training and qualifications of midwives in helping to reduce neonatal mortality. This study by means of its objectives has reaffirmed the cardinal role that the acquisition of basic neonatal resuscitation, training, qualifications and experience of midwives play in saving neonatal lives (De Jong & Ferguson-Hessler, 2010:106-1070; Engelbrecht, Bergh, Pattinson, Makin, Baloyi & Nyasulu, 2015:3). Velaphi and Rhoda (2012:69-70) in a review of studies conducted in South Africa's by healthcare institutions on reducing intra-partum related neonatal deaths, argue strongly that training in basic neonatal resuscitation has been reported to reduce deaths in neonates with intrapartum asphyxia by 30% and early neonatal deaths by 38%, as resuscitation at birth is not always predictable. Several studies, Thomas *et al.* (2007:43) and Gebreegziabher *et al.* (2014:192-202) are also of the view that knowledge of midwives in neonatal resuscitation is vital in reducing neonatal mortality.

### **5.2.3 Objective 3: To describe the relationships between midwives' training, qualifications and experience and their knowledge level in basic neonatal resuscitation**

Table 4.18 shows that 44.7% of midwives with more than 10 years' of experience had an Advanced Midwifery and Neonatal Nursing Science qualification, as well as one or more basic courses in neonatal resuscitation. There was a significant association between the variables: highest qualification and years of experience for practicing as a midwife and it impacted on their knowledge scores with a mean of 82.2%. Participants who had more years of experience and were better qualified had higher knowledge scores. This implies that midwives with more years of experience are more likely to have better qualifications in midwifery.

The study by Gebreegziabher *et al.* (2014:192-202) underlines that emphasis on training of midwives in neonatal resuscitation and expanding their knowledge base of midwifery by means of advanced qualifications are necessary in deepening their experience.

### **5.2.3.1 Relationships between midwives' training, qualifications and experience and their knowledge score**

Table 4.16 indicates that the distribution of total knowledge score percentage is the same across categories of qualification in baseline midwifery, which implies that training in midwifery with reference to neonatal resuscitation is more or less the same. Nevertheless, Advanced Midwifery and Neonatal Nursing Science participants' neonatal resuscitation competencies are more advanced than in Basic Midwifery qualifications. Though, the mean total knowledge score percentage of 80.9% of participants qualified in Advanced Midwifery and Neonatal Nursing Science is slightly above an acceptable score of 80%. This indicates a possibility that a qualification in Advanced Midwifery can influence knowledge level in basic neonatal resuscitation (Gebreegziabher *et al.*, 2014:192-202). Thus, the results of this study suggest that as the midwives gain more experience by practicing as a midwife, there is a notable increase in their knowledge in basic neonatal resuscitation which is part of midwifery practice (Wall *et al.*, 2009:13).

As experience and professional position goes hand-in-hand in the nursing profession, one has to look at the knowledge scores in such a relationship. Table 4.17 shows that Clinical Programme Coordinators have a high mean knowledge score percentage of 85.0%. This may be due to the fact that they are responsible for supportive supervision and mentoring of midwives. However, further testing did not indicate any significant difference between the professional groups. Furthermore, Table 4.18 shows significant knowledge score differences between midwives in relation to experience practicing as a midwife, which means that it is possible that as the midwives gain experience in terms of service in their work, their knowledge increases as this is reflected by their high knowledge score in neonatal resuscitation (Jennex, 2008:33; Benner, 2013:402-7). One would argue that as the midwives obtain more experience, they gain confidence in their ability to perform their duties hence the surge in their knowledge scores in this regard.

## **5.3 LIMITATIONS OF THE STUDY**

The study depended on the availability of the midwives in accordance with the set schedule for the administration of the questionnaires, which was a challenge as the included population in the Chris Hani district hospitals was small. For some variables, the sample size was also too small to do meaningful comparisons between groups as it did not have sufficient power (risk of a Type 2 error). Non-significant statistical associations therefore need to be interpreted with caution.

Furthermore, the study was conducted in the Chris Hani District Hospitals and as such it cannot be generalized to the broader Eastern Cape District Hospitals which were not included in this study.

This study focused on knowledge, which is not the only component of competency that includes elements such as skills and attitudes which were not within the scope of this study.

#### **5.4 CONCLUSIONS**

This research has highlighted the importance of knowledge in empowering the midwives to master their work in the way they prepare the delivery room for the birth and helping neonates breathe at birth within 'The Golden Minute'. Furthermore, the study shows the importance of the relationships between knowledge, experience, training and qualifications. Though no relationships were found between training, qualifications and knowledge scores; experience was found to impact on knowledge of basic neonatal resuscitation. Participants with a qualification in Advanced Midwifery and Neonatal Nursing Science were more likely to have higher knowledge scores and have more experience practising as a midwife.

However, the results of the study did not show a great impact of training. Training may be a factor that can be explored further, as there were differences between groups regarding training, although they were not significant. Training could also be a mediating variable when it comes to the increase of knowledge scores of midwives with regard to experience.

It is also important to observe that training kept emerging as a factor in this study as evidenced in Table 4.24 where there is a cross-tabulation of a significant association between the variables: highest qualification and whether HBB training was received or not ( $X^2$  12.49 [df = 3],  $p = 0.006$ ); indicates that midwives may have attended more than one course (pre-service, postgraduate, in-service) where they may have gained knowledge on basic neonatal resuscitation skills. It therefore makes it difficult to determine how individual courses influence their knowledge. Training also incorporates latest approaches which are necessary in order to keep pace with forever emerging innovations in midwifery (Monebenimp *et al.*, 2012, 8-14).

While the focus of the study was not on training per se, on-going training of health workers forms the core of WHO guidelines in dealing with health-related problems. Focus on training will need to be broadened to include attitudes, competences and skills. Other studies such as the one outlined by Monebenimp *et al.* (2012, 8-14) prove in-service training as having a direct effect in reducing neonatal mortality rate.

The study findings implied that the midwives who were longer in midwifery services obtained higher knowledge scores as they gained knowledge through experience (Table 4.18). These midwives were more likely to have been afforded the opportunity for further study in midwifery speciality. It could thus be necessary to identify nurses for specialisation in the various fields of midwifery and neonatology. As this is a long-term strategy, mentoring of those midwives who join the service by the experienced midwives will also empower them to gain more experience, thus leading to self-motivation and more knowledge (Kim *et al.*, 2013:4-5).

Some studies point out that no single strategy can succeed in reducing neonatal mortality, therefore they advocate for multi-pronged strategies which may include use of incentives for midwives in order to motivate them to value their work and thus find satisfaction meeting the Sustainable Development Goals 2030 (Flatman, 2015:10; Baiden *et al.*, 2006:534).

The conceptual framework for this research (Figure 1.1) was constructed based on the literature of the grounded theory of knowledge management (Jennex, 2008:33) and the theory of Dr Patricia Benner on the levels of nursing experience (Benner, 2013:402-7). Moreover, Bennet and Bennet (2008:1) established that there is a correlation between knowledge and corresponding levels of learning and action. Midwives as part of the health care professionals play a critical role in knowledge generation and management which are vital in neonatal resuscitation and reduction of neonatal mortality. Therefore, different types of knowledge may invariably contribute in equipping midwives to address neonatal mortality (De Jong & Ferguson-Hessler, 2010:106-7). Factors like highest qualification in midwifery, continual training in neonatal resuscitation, professional position, as well as experience in practising as a midwife help to level the playing fields in ensuring that midwives are knowledgeable in basic neonatal resuscitation as indicated in Tables 4:16; 4:17 and 4:18. Thus, this is instrumental in improving their work performance. This implies therefore that the interplay of factors might have an effect on the knowledge score in support of the aforementioned statement.

## **5.5 RECOMMENDATIONS**

The following proposed recommendations of this study are intended to empower the midwives to be well-prepared for the 2030 Agenda for the Sustainable Development Goals and to serve as catalysts for change and competence in the operations of midwives through acquisition of relevant knowledge, training and experience.

### **5.5.1 Recommendation 1: Retention strategy for Advanced Midwives**

The results indicated that participants with more experience were more likely to have higher knowledge scores. Advanced and / or experienced midwives should be motivated and be provided with incentives to deepen their knowledge through further study and specialised training in midwifery.

A district retention strategy needs to be in place and implemented accordingly for the retention of experienced midwives at the rural areas like district hospitals; as the study has shown that more experienced midwives are more knowledgeable. This is supported by the study (Kim *et al.*, 2013:3-4) which underscores the invaluable investment in tailor-made training that has been undertaken in both pre-service and in-service of midwives. The NDoH provides incentives for midwives at district hospitals in the form of the rural allowance.

The inclusion of a special salary scale over and above the rural allowance with additional performance bonus and / or a progressive salary notch for outstanding performance every two years is recommended (National Department of Health, 2014:1-6). These incentives could be made more attractive in order to entice more experienced midwives to serve in hospitals. Merit certificates could be provided to exceptional midwives and used for promotional purposes in job advancement.

### **5.5.2 Recommendation 2: Train-the-trainer programmes for Advanced Midwives**

Advanced and / or experienced midwives trained to train other midwives and certified as master trainers in different short courses must be groomed to undertake and lead the training of upcoming midwives as a means to instill them with knowledge, skills and attitudes that are necessary to make the midwives excel in their work.

The fast pace of change and development call upon for the use of master trainers, who are to be up-to-date with modern training approaches. Master trainers are ideally placed to customise their training methods so that they must be in a position to meet the changing and varying needs of health workers (De Jong & Ferguson-Hessler, 2010:106-7). Midwifery as a specialised field could thrive in this and place the midwives at the centre stage of provision of efficient and effective services that are focused on reducing neonatal mortality (Upadhyay *et al.*, 2012:4).

Presently there is an initiative and exploration by the National Department of Health for an advanced training course for master trainers who are selected specialists nurses in various nursing specialisation categories in all provinces. This is modelled on the Department of Health establishment of District Specialist Team which focus is to provide clinical mentorship

and guidance to health professionals who are placed in Department of Health District Hospitals (National Department of Health, 2014:1-6).

### **5.5.3 Recommendation 3: Review the need for neonatal resuscitation training and its impact on knowledge**

Training of the midwives forms one of the priority programmes of Department of Health in general and that of the Eastern Cape in particular. It provides an enabling and empowering environment in which those that receive training sharpen their knowledge and skills and perform to the best of their abilities. Midwives with the one year basic diploma in Midwifery constituted the highest percentage of nurses trained in HBB. Furthermore, the results as in Table 4.7 show that the recent categories of training attended were HBB, ESMOE and Neonatal Resuscitation which were the current available categories of training that midwives attended more. Training also incorporates latest approaches which are current with midwifery content and thus the participants become up to date with the latest development with regard to their profession (Monebenimp *et al.*, 2012, 8-14; International Movement, 2014: 64).

The point of departure here is to evaluate training with the view to determine its impact on the knowledge of midwives in handling non-breathing neonates and reducing neonatal mortality. Then after getting the sense of how impactful it is; more workshops for neonatal resuscitation through the use of relevant courses like HBB, ESMOE and others may have to be scaled up in this regard. The literature review underlines in-service training as helpful in ensuring the efficiency and effectiveness of midwives in dealing with the resuscitation of neonates in reducing neonatal mortality (Chikuse *et al.*, 2012:351-357). Therefore, linking training with implementation of the Continuing Professional Development (CPD) points; which is an important mechanism to allow midwives to expand their knowledge on neonatal resuscitation and thus partly contribute to reducing neonatal mortality (Moetsana-Poka, Lebaka & McCarthy, 2014:10). Post training monitoring and evaluation of its effectiveness in knowledge gain is essential so as to put in place quality improvement plans for closing the gaps identified (Thomas *et al.*, 2007:43).

## **5.6 FUTURE RESEARCH**

This study shows that resuscitation training does not have much impact on the knowledge on basic neonatal resuscitation at birth. Thus, training in itself should be addressed so as to find out how it can have a greater impact. This implies that more research into the impact of training on the knowledge and skills of midwives is urgently needed. Moreover, attempts

should be made to ascertain what type of training would be the most effective in improving neonatal morbidity and mortality outcomes.

There is a need to conduct a study that focuses on the skills and competencies of the midwives in order to give a holistic view of the neonatal resuscitation by the midwives at district hospital level. In order to determine trends with regard to knowledge, skills and attitudes of midwives in South Africa the research needs to be extended to a broader area than a district in order to make generalisations. Moreover, this is intended to establish whether training introduced in a specific district makes a difference in knowledge scores over a period of time. Accordingly, such research in the Eastern Cape could contribute to the implementation of local and national strategies to reduce neonatal mortality and empower midwives with regard to their professional responsibilities.

## **5.7 DISSEMINATION**

The researcher will present the findings of this research to the Eastern Cape Maternal and Child Directorate of the Department of Health; Chris Hani District management team and Chris Hani District health stakeholder forum. Furthermore, the results will be published in the form of this thesis through the University of Stellenbosch, as well as in accredited journals for health-related issues. The abstract of the study will be submitted to the midwifery congress for the Human Sciences Research Conference on Sustainable Development (Pretoria) in May 2017 and the Society of Midwives of South Africa (SOMSA) in August 2017.

## **5.8 CONCLUSION**

The critical part which knowledge plays in empowering midwives to carry out their work has been highlighted in this study. In accordance with the theory of Benner (2013:402-7) from novice to expert, the midwives will be mentored by means of training in order to improve their knowledge of neonatal resuscitation. Furthermore, this research has shown interplay of qualifications, training and experience as essential in the diverse strategies and approaches to basic neonatal resuscitation knowledge that could be used to reduce neonatal mortality. Knowledge management by the midwives in one way or other play a role in mitigating against neonatal deaths as shown in figure 1.1 (Jennex, 2008:33; Benner, 2013:402-7).

This study intends to add value to midwives leading into achieving the Sustainable Development Goal in 2030; specifically Goal 3 which will ensure healthy lives and promote well-being for all ages. These study findings and recommendations will strengthen the health

systems that are in place to end preventable neonatal deaths by aiming to reduce neonatal mortality at least as low as 12 per 1 000 live births; through imparting updated basic neonatal resuscitation knowledge to midwives (United Nations, 2015:20).

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## APPENDICES

### APPENDIX 1: ETHICAL APPROVAL FROM STELLENBOSCH UNIVERSITY



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jou kennisvenoot • your knowledge partner

#### Approval Notice Response to Modifications- (New Application)

10-Nov-2015

**Ndzima-Konzeka, Florence FF**

**Ethics Reference #: S15/07/146**

**Title: The knowledge of basic neonatal resuscitation among midwives at district hospitals.**

Dear Ms Florence Ndzima-Konzeka,

The **Response to Modifications - (New Application)** received on **05-Oct-2015**, was reviewed by members of **Health Research Ethics Committee 1** via Expedited review procedures on **10-Nov-2015** and was approved..

Please note the following information about your approved research protocol:

Protocol Approval Period: **10-Nov-2015 -09-Nov-2016**

Please remember to use your **protocol number (S15/07/146)** on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

#### **After Ethical Review:**

Please note a template of the progress report is obtainable on [www.sun.ac.za/rds](http://www.sun.ac.za/rds) and should be submitted to the Committee before the year has expired.

The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372

Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

### **Provincial and City of Cape Town Approval**

Please note that for research at primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel:+27214839907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel:+27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and documents please visit: [www.sun.ac.za/rds](http://www.sun.ac.za/rds)

If you have any questions or need further assistance, please contact the HREC office at 0219389657.

### **Included Documents:**

Protocol

Protocol Synopsis

Checklist

CV T Crowley

20151105 MOD Checklist

20151105 MOD Consent form

20151105 MOD Protocol

Budget

Application form

Participant information leaflet & consent form

CV J Morgan

20151105 MOD Cover letter

Investigators Declarations

CV F Ndzima-Konzeka

Sincerely,

Franklin Weber

HREC Coordinator

Health Research Ethics Committee 1

## APPENDIX 2: PERMISSION OBTAINED FROM INSTITUTIONS / DEPARTMENT OF HEALTH



### Eastern Cape Department of Health

Enquiries: Zonwabele\_Merile:

Tel No 040 608 0830

Date: 26 November 2015

Fax No: 043 642 1409

e-mail address: [zonwabele.merile@ehealth.gov.za](mailto:zonwabele.merile@ehealth.gov.za)

Dear Mrs FF Ndzima-Konzeka

**RE: the knowledge of basic neonatal resuscitation among midwives at district hospitals**

**(EC\_2015RP12\_214)**

The Department of Health would like to inform you that your application for conducting a research on the abovementioned topic has been approved based on the following conditions:

1. During your study, you will follow the submitted protocol with ethical approval and can only deviate from it after having a written approval from the Department of Health in writing.
2. You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality of their identities and shall remove or not collect any information which can be used to link the participants.
3. The Department of Health expects you to provide a progress on your study every 3 months (from date you received this letter) in writing.
4. At the end of your study, you will be expected to send a full written report with your findings and implementable recommendations to the Epidemiological Research & Surveillance Management. You may be invited to the department to come and present your research findings with your implementable recommendations.
5. Your results on the Eastern Cape will not be presented anywhere unless you have shared them with the Department of Health as indicated above.

Your compliance in this regard will be highly appreciated.



SECRETARIAT: EASTERN CAPE HEALTH RESEARCH COMMITTEE *Ikamva eliqaqambileyo!*

## **APPENDIX 3: PARTICIPANT INFORMATION LEAFLET AND DECLARATION OF CONSENT BY PARTICIPANT AND INVESTIGATOR**

**TITLE OF THE RESEARCH PROJECT:** THE KNOWLEDGE OF BASIC NEONATAL RESUSCITATION AMONG MIDWIVES AT DISTRICT HOSPITALS

**REFERENCE NUMBER:** 18728162

**PRINCIPAL INVESTIGATOR:** MRS F. F. NDZIMA-KONZEKA

**ADDRESS:** P.O. BOX 12335. AMALINDA. EAST LONDON. 5252

**CONTACT NUMBER:** 082 718 6979

**HREC CONTACT NUMBER:** 021 938 9207 (matters of concern)

Dear Colleague

My name is **Florence Fezeka Ndzima-Konzeka** and I am a **Masters Degree Student**; I would like to invite you to participate in a research project that aims to **determine the knowledge of basic neonatal resuscitation among registered midwives, at the Chris Hani Health District Hospitals.**

Please take some time to read the information presented here, which will explain the details of this project and contact me if you require further explanation or clarification of any aspect of the study. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee (HREC) at Stellenbosch University** and will be conducted according to accepted and applicable National and International ethical guidelines and principles, including those of the international Declaration of Helsinki October 2013. The sponsors of the study, study monitors or auditors or HREC members may need to inspect research records.

### **What is this research study all about?**

The aim of the study is to investigate the knowledge of registered midwives in regards to basic neonatal resuscitation, at the Chris Hani Health District Hospitals.

### **Objectives of the study:**

The study is neither the participants' performance appraisal nor about identifying participants with poor knowledge; but to identify gaps in general that will assist in identifying effective support needs and on-site training of midwives with regards to basic neonatal resuscitation at birth.

**Population:** The target population for this study will consist of **145** registered midwives working in the **thirteen district hospitals with maternity wards of the Christ Hani Health District**. Data will be collected by means of a questionnaire consisting of multiple choice questions. Questionnaires will be distributed to individual midwives personally for completion and will be collected separately from the consent form by the field worker on the same day.

**Why have you been invited to participate?**

You are invited to participate in this study as you are a midwife working in the maternity ward of a district hospital at the Chris Hani Health District.

**What will your responsibilities be?**

You will participate in this study by completing a questionnaire that will take approximately thirty (30) minutes and handing it over to the field worker after completion. You will be asked to sign the attached consent form as proof of agreement to participate before you complete the questionnaire. This is an important document to show that you freely agreed to participate.

**Will you benefit from taking part in this research?**

You have no specific benefit by participating in the study. The results of the study might possibly contribute to the on-site training and support of the registered midwives in the district, province and the country in general.

**Are there any risks involved in your taking part in this research?**

There is no foreseen risk that is related to your participation in this project. The information you will provide will be totally anonymous. The consent form and questionnaire will be placed in separate envelopes so as not to connect the two.

**If you do not agree to take part, what alternatives do you have?**

This is completely voluntary and will have no repercussion should you not participate. The information you provide will be kept confidential, be accessible only to the researcher and all records will be kept in a safe place for years after the completion of the study. There will be no name on the questionnaire only a number will be used to guide the data analysis.

**What will happen in the unlikely event of some form injury occurring as a direct result of your taking part in this research study?**

There is no risk of injury related to your participation in this study.

**Will you be paid to take part in this study and are there any costs involved?**

No, you will not be paid to take part in the study. There will also be no costs involved for you, if you do take part. You are freely volunteering to help the researcher with information for her Master's Degree.

**Is there anything else that you should know or do?**

- You can contact the study supervisor: Mrs J. Morgan at: 021-938 9619. If you have any further queries or encounter any problems.
- You can contact the Committee for Human Research at Stellenbosch University at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by the researcher.

**If you are willing to participate in this study please sign the attached Declaration of Consent and hand it to the fieldworker together with the completed questionnaire.**

Yours sincerely

Mrs F. F. Ndzima-Konzeka

Principal Investigator

## Declaration by participant

By signing below, I ..... agree to take part in a research study entitled: “Knowledge of Basic Neonatal Resuscitation among Midwives at District Hospitals”.

.

I declare that:

- I have read the attached information leaflet and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) .....On (*date*) ..... 2016.

.....

**Signature of participant**

**APPENDIX 4: INSTRUMENT / QUESTIONNAIRE****QUESTIONNAIRE****DATE OF COMPLETION:** .....

**Study Title:** The knowledge of basic neonatal resuscitation among midwives at district hospitals.

**Aim of the Study:** Is to determine the knowledge level of registered midwives on basic neonatal resuscitation, in the Chris Hani Health District Hospital in the Eastern Cape. Your role as a midwife is to shed light on your knowledge in the resuscitation of neonates at a district hospital level.

**Instructions:** You are free to participate in this research without any obligations. All information will be treated as confidential and the researcher undertakes not to reveal any individual information that appears in this questionnaire. To complete this 6-page questionnaire, you will take approximately 30 minutes.

All you need to do is to **CIRCLE** your most appropriate response(s) below:

**SECTION A: BIOGRAPHICAL DATA****1. What is your gender?**

Female	1
Male	2

**2. What is your race group?**

African	1
Coloured	2
Indian	3
White	4

**3. Indicate your age?**

**4. Indicate your marital status?**

Single	1
Married	2
Divorced	3
Widowed	4

**5. Indicate your highest qualification in midwifery**

4 year degree in General Nursing and Midwifery (Psychiatry & Community Health Science)	1
4 years diploma in General Nursing and Midwifery (Psychiatry & Community Health Science)	2
1 year basic diploma in Midwifery	3
Post basic diploma in Midwifery and Neonatal Nursing Science (Advanced Midwifery)	4
Masters in Post-basic Midwifery and Neonatal Nursing Science	5

**6. Indicate the professional position in the unit /area.**

Professional Nurse: General	1
Professional Nurse: Speciality	2
Clinical Programme Coordinator	3
Operational Manager	4

**7. Indicate how many years of experience practising as a midwife?**

Less than 3 years	1
3 years – less than 5years	2
5 years – 10years	3
More than 10years	4

**8. Indicate your training in neonatal resuscitation (indicate all that apply)**

	Training Received (YES/NO)		If yes, provide the date	
	Yes	No	Month	Year
Helping Babies Breathe (HBB)	1	2		
Essential Steps in Management of Obstetric Emergencies (ESMOE)	1	2		
Neonatal Resuscitation	1	2		
Paediatric Life Support	1	2		
Other(s) Specify	1	2		

**9. How often do you participate in a neonatal resuscitation?**

Daily	1
Weekly	2
Monthly	3
Quarterly	4
Yearly	5

**10. When was the last time you participated in a neonatal resuscitation?**

Within the past week	1
Within the past month	2
Within the last 3 months	3
Within the last 6 months	4
Within the last year	5

**SECTION B: KNOWLEDGE ON BASIC NEONATAL RESUSCITATION**

Select the most appropriate answer to each question or statement by means of making a CIRCLE in the appropriate box.

**11. In which of the following situations would you anticipate that the neonate will need resuscitation at birth?**

Caesarean section under general anaesthesia	1
Caesarean section under epidural anaesthesia	2
Mother had pethidine 8 hours before delivery	3
Mother received nitrous oxide during the second stage of labour	4

**12. To prepare for a birth**

You identify a helper and make an emergency plan	1
You ask everyone but the mother to leave the area	2
You prepare equipment only when you need it	3
You do not need a helper	4

**13. To prepare the area for delivery**

Open all the doors and windows to get fresh air	1
A clean space for the baby will not be required	2
Make sure the area is clean, warm, and well-lighted	3
Keep the room temperature cold	4

**14. What should you do to keep the baby clean?**

Wash your hands before touching the baby and help mother wash her hands before breastfeeding	1
Reuse the suction device before cleaning	2
Keep the umbilical cord tightly covered	3
Do not touch the baby	4

**15. What is the value of the 1 minute Apgar score?**

It predicts brain damage.	1
It confirms fetal hypoxia.	2
It is used to assess the infant's clinical condition at birth.	3
It is used to assess gestational age.	4

**16. What should you do in The Golden Minute?**

Bathe the baby	1
Deliver the placenta	2
Evaluate the heart rate	3
Help a baby breathe if necessary	4

**17. A baby is quiet, limp and not breathing at birth. What should you do?**

Dry the baby thoroughly	1
Shake the baby	2
Throw cold water on the face	3
Hold the baby upside down	4

**18. Newborn baby is quiet, limp and not crying. The baby does not respond to steps to stimulate breathing. What should you do next?**

Slap the baby's back	1
Hold the baby upside down	2
Squeeze the baby's ribs	3
Begin ventilation	4

**19. An infant who cannot be adequately ventilated with bag and mask should:**

Be intubated and ventilated	1
Be given chest compressions	2
Be given adrenaline.	3
Receive no further resuscitation as it has probably suffered brain damage	4

**20. Which of the following rates is recommended for ventilating a newborn infant?**

20 breaths per minute	1
40 breaths per minute	2
80 breaths per minute	3
140 breaths per minute	4

Circle the appropriate response TRUE to agree or FALSE to disagree with the following statements.

**21. In order to have an effective ventilation with bag and mask:**

	True	False
The mask should cover the eyes	1	2
Air should escape between the mask and face	1	2
Squeeze the bag to produce gentle movement of the chest	1	2
Squeeze the bag to give 80 to 100 breaths per minute	1	2

**22. You can stop ventilation if:**

	True	False
Baby is blue and limp	1	2
Baby's heart rate is 80 per minute	1	2
Baby's heart rate is 120 per minute and the chest is not moving	1	2
Baby's heart rate is 120 per minute and the baby is breathing or crying	1	2

**23. A newborn baby's heart rate should be:**

	True	False
Faster than your heart rate	1	2
Slower than your heart rate	1	2

**24. In newborn babies who do not require positive-pressure ventilation, the cord should be clamped earlier than one minute after birth.**

True	1
False	2

**25. In the presence of meconium-stained amniotic fluid, intrapartum suctioning of the mouth and nose at the delivery of the head is not recommended.**

True	1
False	2

**26. During ventilation with bag and mask, it is important to select the mask that covers the chin, mouth and nose, but not the eyes.**

True	1
False	2

**27. A good seal between the mask and the face allows you to move air into the baby's lungs during ventilation.**

True	1
False	2

**28. To help open the baby's airway, you should position the baby's head hyper extended.**

True	1
False	2

**29. In newborn babies who do not start breathing despite thorough drying and additional stimulation, positive-pressure ventilation should be initiated within two minutes after birth.**

True	1
False	2

**30. A baby who is not breathing well (gaspings or not breathing at all) needs continued ventilation with bag and mask.**

True	1
False	2

**31. You can stop ventilation if the baby's heart rate is 120 per minute and the baby is breathing or crying.**

True	1
False	2

**32. In newborn babies with no detectable heart rate after 10 minutes of effective ventilation, resuscitation should not be stopped.**

True	1
False	2

**33. "You are called to assist the delivery of a term baby. There are no complications in the pregnancy. The baby will be born in less than 10 minutes. Introduce yourself and prepare for the birth and care for the baby."**

Prioritise the following 4 steps on preparation for birth in **SEQUENCE OF 1 TO 4** (write the step number in the column below):

a	Cleans hands and maintains clean equipment throughout	
b	Prepares an area for ventilation and checks equipment	
c	Identifies a helper and makes an emergency plan	
d	Prepares the area for delivery	

**THANK YOU FOR YOUR TIME TO COMPLETE THIS QUESTIONNAIRE**

**Mrs Florence Fezeka Ndzima-Konzeka**

**M Cur Student**

**Cell No: 082 718 6979**

## APPENDIX 5: DECLARATION BY LANGUAGE EDITOR



Lona's Language Services

English/Afrikaans  
Afrikaans/English

3 Beroma Crescent Beroma Bellville  
Tel 0219514257  
Cell 0782648484  
Email [illona@toptutoring.co.za](mailto:illona@toptutoring.co.za)

\* Translations \* Editing \* Proof Reading  
\* Transcription of Historical Docs  
\* Transcription of Qualitative Research  
\* Preparation of Website Articles

### **TO WHOM IT MAY CONCERN**

This letter serves to confirm that the undersigned

**ILLONA ALTHAEA MEYER**

has proof-read and edited the document contained herein for language correctness.

Signed

Ms IA Meyer

28 October 2016

**FOR: FLORENCE FEZEKA NDZIMA-KONZEKA**

**TITLE: THE KNOWLEDGE OF BASIC NEONATAL RESUSCITATION AMONG  
MIDWIVES AT DISTRICT HOSPITALS**

Re-edited on 15 November 2016.

## APPENDIX 6: DECLARATION BY TECHNICAL EDITOR



To whom it may concern

This letter serves as confirmation that I, Lize Vorster, performed the technical formatting of Florence Fezeka Ndzima-Konzeka's thesis entitled: "The knowledge of basic neonatal resuscitation among midwives at district hospitals". This entails complying with the Stellenbosch University's technical requirements for theses and dissertations, as presented in the Calendar Part 1 – General.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Lize Vorster', is written over a simple line drawing of a pen nib.

Lize Vorster  
Language Practitioner