KNOWLEDGE, ATTITUDES AND PRACTICES OF HEALTHCARE WORKERS RELATED TO BREASTFEEDING IN THE MOTHEO DISTRICT, FREE STATE

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Dissertation submitted in fulfilment of the requirements in respect of the Magister Scientiae: Dietetics degree qualification in the Department of Nutrition and Dietetics in the Faculty of Health Sciences at the University of the Free State

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DECLARATION WITH REGARD TO INDEPENDENT WORK

I, **Imke Hennop**, identity number 9007270011089 and student number 2008018984, do hereby declare that this Master's degree dissertation submitted to the University of the Free State for the degree MAGISTER SCIENTIAE (Dietetics): ***Knowledge, Attitudes and Practices of Healthcare Workers Related to Breastfeeding in the Motheo District, Free Sate,*** is my own independent work, and has not been submitted before to any institution by myself or any other person in fulfilment of the requirements for the attainment of any qualification. I further cede copyright of this research in favour of the University of the Free State.

27 November 2020

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GLOSSARY

Exclusive breastfeeding Exclusive breastfeeding is defined as infant feeding that consists of only breast milk. No other liquids or solids are given – not even water – with the exception of oral rehydration solution, or drops/syrups of vitamins, minerals or medicines. (WHO, 2018).

Complementary feeding The process of introducing other solids and liquids, in addition to breastmilk, to an infant (WHO, 2018).

Knowledge related to breastfeeding: Operationally defined as knowledge of exclusive breastfeeding, continued breastfeeding and complementary feeding; management of breastfeeding; benefits of breastfeeding; contra-indications to breastfeeding; breastfeeding in the context of HIV; phases of lactogenesis; and the 10 Steps to Successful Breastfeeding and Infant and Young Child Feeding (IYCF) recommendations.

Attitudes related to breastfeeding: Operationally defined as opinions or attitudes related to aspects of breastfeeding; confidence to support, assist and give mothers breastfeeding advice; and breastfeeding training completed by HCWs.

Practices related to breastfeeding: Operationally defined as actions and recommendations of HCWs in certain situations e.g. weight regain at two weeks; complications related to breastfeeding such as painful nipples and mastitis; low milk production etc.

ABBREVIATIONS

AAP	American Academy of Paediatrics
AFASS	Acceptable, Feasible, Affordable, Sustainable and Safe
ART	Antiretroviral Therapy
BFHI	Baby-friendly Hospital Initiative
CARMMA	Campaigns on Accelerated Reduction of Maternal and Child Mortality
CDC	Centers for Disease Control and Prevention
DoH	Department of Health
EBF	Exclusive Breastfeeding
ESPGHAN	European Society for Paediatric Gastroenterology, Hepatology and Nutrition
FBDG	Food-Based Dietary Guidelines
GPs	General Practitioners
HCWs	Health Care Workers
HIV	Human Immunodeficiency Virus
HPCSA	Health Professions Council of South Africa
IQ	intelligence quotient
IYCF	Infant and Young Child Feeding
KAP	knowledge, attitudes and practices
MBFI	Mother-Baby Friendly Initiative
MNCWH	Maternal, Newborn, Child and Women's Health
PHC	Primary Healthcare
SA	South Africa
SADHS	South Africa Demographic and Health Survey
SANC	South African Nursing Council
SOMSA	Society of Midwives of South Africa
UN	United Nations
UNICEF	United Nations Children's Fund
US	United States
WHO	World Health Organization

TABLE OF CONTENTS

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

SUMMARY

Breastfeeding is widely recognised as the ideal method of infant feeding. Despite this, the percentage of South African mothers that breastfeed (especially exclusively for the first six months of life) remains alarmingly low. Healthcare workers (HCWs) play a key role in promoting, protecting and supporting breastfeeding. A lack of knowledge, negative attitudes and unfavourable practices of HCWs have a major impact on the protection, promotion and support of breastfeeding.

Evidence-based recommendations for infants are continuously summarised by a number of organisations including the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). The current study aimed to assess the breastfeeding knowledge, attitudes and practices (KAP) of HCWs whose responsibilities include supporting breastfeeding in the Motheo district, Free State. These findings were compared to the 2016 WHO and UNICEF guidelines on Infant and Young Child Feeding (IYCF) and 2018 Mother-Baby Friendly Initiative (MBFI) guidelines.

A cross-sectional study design was applied in a total population of 117 HCWs, including paediatricians, obstetricians, general practitioners (GPs) and midwives working in the private and public healthcare sectors. Participants were registered with the Health Professions Council of South Africa (HPCSA) and South African Nursing Council (SANC).

A self-developed questionnaire was used to obtain information related to socio-demographics (age, years practicing in current position, current place of employment and gender) and KAP related to breastfeeding. The questionnaire was self-administered and available in paper and online format.

The median age of participants was 34.0 years and the median years practicing in current profession was 7.0 years. The majority of GPs (85.9%) and midwives (82.1%) worked in public hospitals, while the majority of paediatricians (60%) and half of the obstetricians (50%) were in private practice. More than half of the participants were female (65.8%). In terms of knowledge related to breastfeeding, a significantly higher percentage of GPs (60.6%) than paediatricians (30%), obstetricians (25%), and midwives (50%) were able to list three benefits of breastfeeding for the baby ($p=0.0180$). Although the percentage of HCWs that could list three benefits of

breastfeeding for the mother was low (26.7%), a higher percentage of GPs (33.8%) than paediatricians (20%), obstetricians (25%), and midwives (10.7%) were able to list three benefits of breastfeeding for the mother (p=0.0016). Almost ninety percent of HCWs (89.7%) knew that formula milk does not have the same nutrient composition as breast milk. Although the majority of the total group of HCWs (70%) knew that a breastfeed should not be time limited, a significantly higher percentage of obstetricians (100%) and midwives (82.1%) were aware of this compared to 40% of paediatricians and 66.2% of GPs (p=0.0015). Most HCWs (92.3%) knew that placing a baby in skin-to-skin contact can contribute to the stabilisation of newborn blood glucose levels. Less than fifteen percent of the total group of HCWs (14.5%) were able to name at least one step of the MBFI 10 Steps to Successful Breastfeeding.

In terms of knowledge pertaining to breastfeeding in the context of human immunodeficiency (HIV), only 6% of the total group of HCWs knew that breastfeeding is recommended for an HIV infected mother if the mother is from a lower socio-economic background and does not meet the AFASS (Acceptable, Feasible, Affordable, Sustainable and Safe) criteria. Less than fifty percent (46.1%) of the total group of HCWs were aware of the newest 2017 WHO guideline pertaining to HIV and continued breastfeeding up to two years and beyond while being fully supported for antiretroviral therapy (ART) adherence.

The majority of GPs (76.1%) and midwives (78.6%) recommend exclusive breastfeeding up to the age 6 months, compared to only 10% of paediatricians and 25% of obstetricians, who recommend exclusive breastfeeding for 4 - 6 months. Fewer than 30% of the total group of HCWs (28.3%) recommended continued breastfeeding together with complementary feeding up to 24 months and beyond.

Half of the obstetricians and more than half of paediatricians (60%) encourage mothers to initiate breastfeeding within one hour after birth, compared to the majority of GPs (64.8%) and midwives (71.4%) who encourage mothers to initiate breastfeeding within half an hour after birth, a difference that was statistically significant (p=0.0137). If a mother and baby are separated after birth due to an inadvertent situation and the mother is still able to express enough breast milk, 60% of paediatricians and 50% of obstetricians would recommend using formula milk with a cup, compared to 80.3% GPs and 89.3% midwives who recommend breastmilk with a cup as feeding method (p<0001). Less than half the paediatricians (40%) and

obstetricians (37.5%) recommended rooming in for 24 hours a day, compared to the majority of GPs (80.3%) and midwives (78.6%) (p=0.0152).

If a baby did not regain birth weight before 2 weeks of age and the medical examination results are normal, 60% of paediatricians would recommend supplementing with formula, the majority obstetricians (100%), GPs (60.6%) and midwives (78.6%) would recommend the mother to breastfeed more often and only a quarter of HCW (15.4%) would refer the mother to a lactation specialist (p=0.0096).

In terms of attitude toward breastfeeding, a significantly higher percentage of midwives than other HCWs felt highly confident to successfully show a new mother how to correctly position and attach the baby to the breast for breastfeeding and to give her breastfeeding advice (p=0.0004 and p=0.0050 respectively). Fewer than half of paediatricians (41%), GPs (40.8%) and 50% of midwives felt highly confident to give mothers advice on how to treat breastfeeding complications e.g. mastitis, bleeding nipples, breast abscess, engorgement, nipple bleb and blocked duct.

Fifty percent of paediatricians and 37.5% of obstetricians believed that there is no harm in using pacifiers and/or bottles, compared to the majority of 71.8% GPs and 85.7% midwives who would not recommend the use of bottles and pacifiers, a difference that was statistically significant (p=0.0007).

In terms of practices related to breastfeeding, more than half of the total group of HCWs (56%) had not previously completed the 20 hour WHO Lactation Management Training. Seventy percent of the paediatricians, 100% obstetricians and 56.3% GPs felt that the breastfeeding training that they received during their studies was not adequate and did not equip them to support and educate breastfeeding mothers, compared to more than half of midwives (57.1%) that felt that their breastfeeding training was adequate (p=0.0481).

In conclusion, in-depth knowledge pertaining to certain important aspects of breastfeeding were lacking in all HCWs. In addition, a large percentage of HCWs were not confident to support mothers to breastfeed and their practices did not comply with the 2016 WHO Infant and Young Child Feeding guidelines and with the 2018 MBFI 10 Steps to Successful Breastfeeding. In order to successfully promote, protect and support breastfeeding, the 20 hour WHO Lactation Management Training should be implemented universally and regularly to ensure that HCWs stay updated with the most recent IYCF guidelines and MBFI 10 Steps to Successful Breastfeeding.

CHAPTER 1

MOTIVATION FOR THE STUDY

1.1 Introduction

Every year, 2.7 million newborns in the world die. Almost 50% of deaths in children under 5 years of age are related to malnutrition, with almost half of these deaths occurring in Africa. Early initiation of exclusive breastfeeding (EBF) is the most successful and cost-effective way to help prevent neonatal deaths (de Graft-Johnson *et al*., 2017; Chaturvedi *et al*., 2014; DoH, 2009). According to Black *et al.* (2013), 10% of the disease burden in children under the age of 5 years and 1.4 million deaths in this age group are related to sub-optimal breastfeeding practices, especially mixed feeding (Black *et al*., 2013). During the first 6 months of life, EBF protects infants against life threatening diseases by reducing the risk of morbidity by up to 70% (Alamirew *et al*., 2017). In high, middle and low-income countries, studies have reported a decrease in mortality of 1.5- to 5-fold in exclusively breastfed infants compared to those that are not exclusively breastfed (Alamirew *et al*., 2017; Heymann & Earle, 2013). In view of the above, breastfeeding is not only considered to be an important global public health issue, but EBF for the first 6 months of an infant's life is considered a global public health goal (Alamirew *et al*., 2017; McInnes & Chambers, 2008).

1.2 The role of healthcare workers (HCWs) in protecting, promoting and supporting breastfeeding

It has been clearly established that breastfeeding is the best feeding option for the mother-infant pair. Despite this, HCWs' knowledge of lactation management has been neglected for many years (Creedy *et al*., 2008). Repeatedly, research finds that HCWs do not provide consistent breastfeeding support to new mothers. The lack of knowledge, negative attitudes and unfavourable practices to protect, promote and support breastfeeding among HCWs has been confirmed in the literature. Many HCWs lack knowledge about breastfeeding, have unfavourable attitudes towards breastfeeding and lack the skills to support breastfeeding women which negatively influences the establishment and maintenance of breastfeeding (de Jesus *et al*., 2016;

Bernaix *et al*., 2010). Evidence suggests that many HCWs do not have the necessary knowledge and skills to increase neonatal survival through the promotion of breastfeeding (de Graft-Johnson *et al*., 2017). In order to provide optimal infant feeding support, HCWs need accurate information, appropriate and relevant skills and a positive attitude towards breastfeeding. Sadly, this is not the case in most South African health care facilities. Data shows that EBF rates are optimised when women receive consistent, accurate and positive messages concerning breastfeeding from HCWs during antenatal, intra-partum, post-natal and follow-up care (Bosman *et al*., 2011). Therefore, every HCW working with mothers and babies should understand the role of breastfeeding and breastmilk, and their role in protecting, promoting and supporting breastfeeding and knowing when to refer to a lactation care professional (Mass, 2015). To assist families in making informed infant feeding choices, HCWs must remain up to date with current evidence regarding breastfeeding (Sigman-Grant & Kim, 2015).

1.3 Problem Statement

Healthcare workers play a critical role in protecting, promoting and supporting breastfeeding, yet the literature indicates that they are not always equipped to do this successfully. Accurate assessment of breastfeeding knowledge, attitudes and practices (KAP) of HCWs can identify learning shortfalls, motivate the content of breastfeeding training programmes and improve practice to the benefit of both infants and mothers (Creedy et al., 2008). Considering that the most recent study conducted in South Africa to assess the KAP of HCWs (only obstetricians and paediatricians) was by Videlefsky *et al.* in 1996, the current study to assess these factors in South Africa is justified.

1.3 Aim and Objectives

1.3.1 Main Aim

The main aim of this study was to assess the breastfeeding KAP of HCWs whose responsibilities include supporting breastfeeding in the Motheo district, Free State.

1.3.2 Objectives:

To achieve the main aim, the following objectives were set:

6.1.1 To determine:

- Socio-demography of healthcare workers; and
- KAP of healthcare workers.

6.1.2 To compare:

- Current KAP of healthcare workers with the 2016 WHO and UNICEF guidelines on Infant and Young Child Feeding (IYCF) and 2018 Mother-Baby Friendly initiative (MBFI) guidelines.

1.4 Outline of the Dissertation

This dissertation is divided into six chapters. Figure 1.1 provides an overview of the outline of the dissertation, highlighting chapter 1, the introduction to the study:

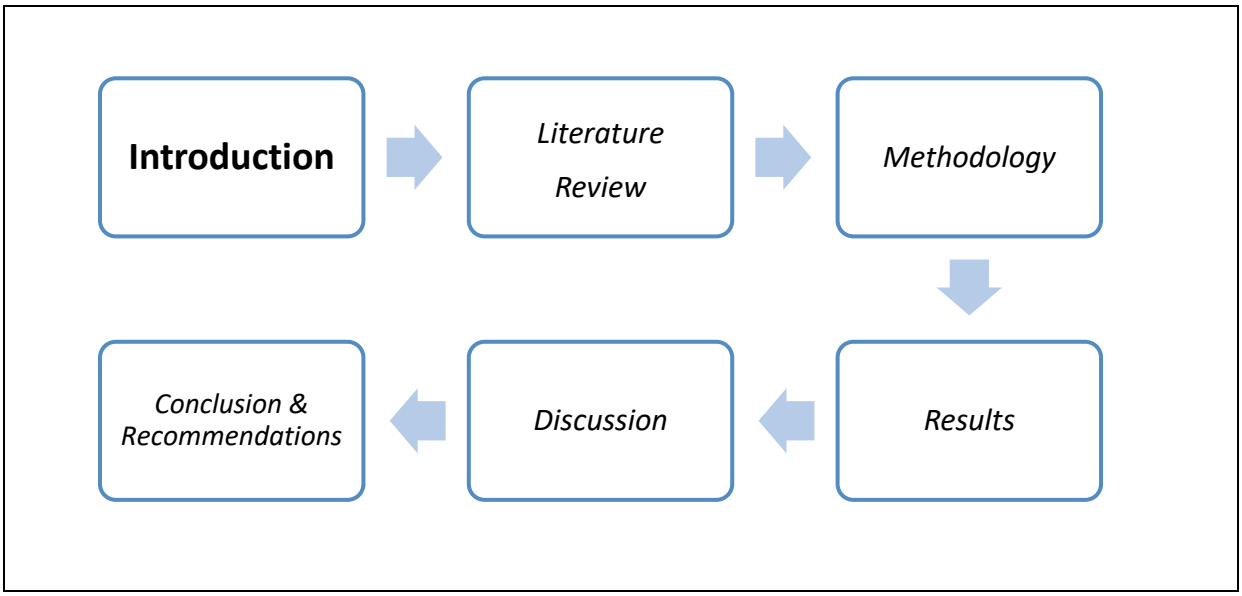

Figure 1.1: Outline of the dissertation: Introduction

In Chapter 1 the motivation for the study as well as the aim and objectives have been outlined. Chapter 2 comprises the literature review. In Chapter 3 the methodology is explained, including study design, population and sample selection, measurements,

the data collection process and ethical considerations. Chapter 4 includes the results of the study, and in Chapter 5 these results are discussed in relation to other relevant literature. Chapter 6 comprises conclusions and recommendations related to practice as well as to future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

It has been clearly established that breast milk is the ideal food source for the newborn infant that contributes to the child's immunity and overall development. In addition, it also has emotional, socioeconomic, and maternal benefits (Siziba *et al*., 2015; De Almeida *et al*. 2015). Despite the recommendation of the WHO and UNICEF that infants should be exclusively breastfed for the first 6 months of life and continue to breastfeed together with adequate complementary feeding up to 24 months and beyond, exclusive breastfeeding and overall breastfeeding rates in South Africa remain alarmingly low (WHO, 2018).

In terms of adherence to the Baby-friendly Hospital Initiative's (BFHI's) Ten Steps to Successful Breastfeeding, a systematic review from 19 countries that assessed the BFHI indicated that breastfeeding rates in general and specifically early introduction of breastfeeding needed to be improved. Having the right policies, programmes and people in place provides a strong support network for mothers (WHO, 2018). Step 2 of the BFHI refers to the training of HCWs to equip them with adequate knowledge and skills to implement the Ten Steps to Successful Breastfeeding (De Almeida *et al*. 2015).

Numerous studies have reported that poor breastfeeding knowledge, unfavourable attitudes towards breastfeeding and unjustified medical intervention approaches towards breastfeeding in HCWs, negatively influence establishment and maintenance of breastfeeding. Insufficient breastfeeding training has been identified as the root cause of poor KAP related to breastfeeding in HCWs (De Almeida *et al*. 2015). Figure 2.1 depicts how the literature review fits into the progression of the study.

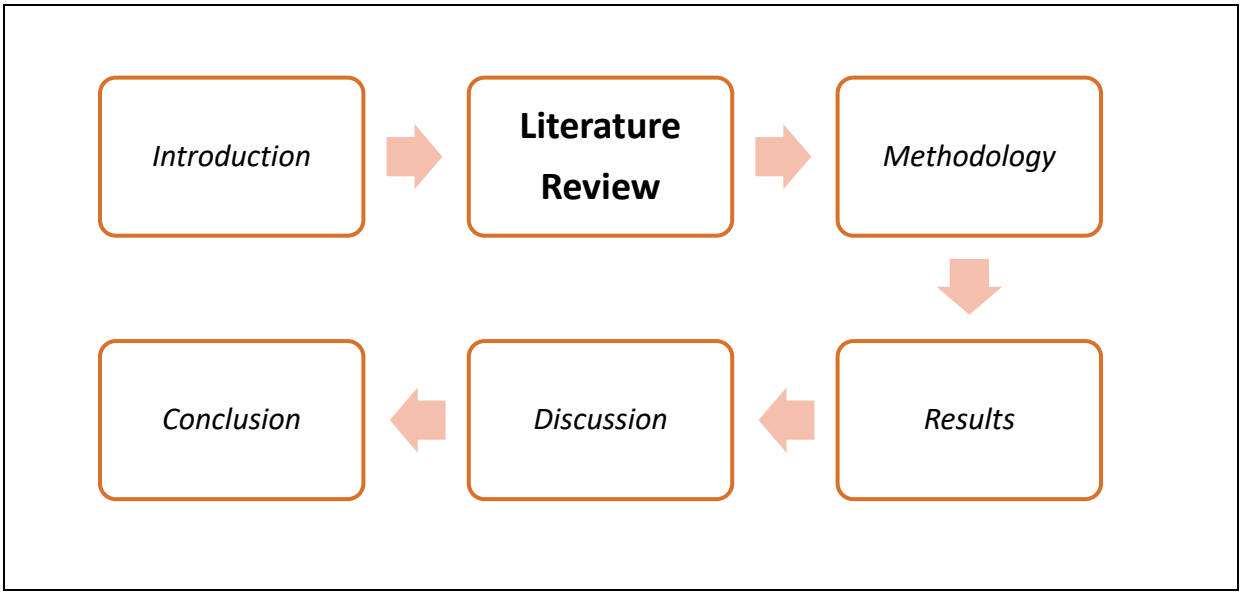

Figure 2.1: Progression of the study: Literature Review

2.2 Breastfeeding recommendations (WHO, UNICEF, AAP)

Major health organisations and most government agencies recommend EBF for 6 months and continuation of breastfeeding for one year or longer (Edwards *et al*., 2015; Stuebe, 2014). The American Academy of Paediatrics (AAP), World Health Organization (WHO), United Nations Children's Fund (UNICEF), Health Canada as well as the United States Department of Health and Human Services all recommend initiation of breastfeeding within 1 hour after birth (Archer *et al*., 2017; DoH, 2011) and EBF (no other foods or liquids, including water) for the first 6 months of life. The European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN), and American and Australian allergy expert committee guidelines recommend introducing solids at 4-6 months of age for genetically predisposed atopic infants. This, however, is not the recommendation in developing countries where morbidity of children who are not breastfed is very high (Fewtrell *et al*., 2017; Fleischer *et al*., 2013; Greer *et al*., 2008). The WHO and UNICEF recommend breastfeeding on demand – as often as the baby wants to feed, day and night, without limiting the time of feeds. No pacifiers, bottles or teats should be used in breastfed infants. The AAP recommends continued breastfeeding in addition to complementary foods until 12 months of age or longer, whereas the WHO recommends continued breastfeeding along with complementary foods until 24 months of age or longer (Alamirew *et al*.,

2017; Archer *et al*., 2017; Heymann & Earle, 2013; Mclnerny, 2014; Ramakrishnan *et al*., 2014; Cockerham-Colas *et al*., 2012; Nesbitt *et al.,* 2012; Perrine *et al*., 2012; DoH, 2011). The 2007 South African paediatric food-based dietary guideline (FBDG) on breastfeeding emphasises the importance of South Africa (SA) adopting the current International breastfeeding guidelines (du Plessis & Pereira, 2013).

2.3 Initiatives, policies and programmes implemented to protect, promote and support exclusive breastfeeding

The need to address concerns related to the quality of maternal and newborn care in health facilities around the globe has been identified in many countries (de Graft-Johnson *et al*., 2017). The “Ten Steps to Successful Breastfeeding” were introduced when the WHO and UNICEF released a joint statement titled “Protecting, Promoting and Supporting Breastfeeding: The special role of maternity services”. Additional global initiatives include the International Code of Marketing of Breastmilk Substitutes, the Global Strategy for Infant and Young Child Feeding, the Baby Friendly Hospital Initiative (now called the Mother-Baby Friendly Initiative), the Innocenti Declaration, and the 2010 United Nations (UN) Joint Guidelines on HIV and Infant Feeding. In 2011, the South African Department of Health declared that they would aggressively promote, protect and support breastfeeding (exclusive) to improve child survival as part of public health interventions (DoH, 2011). In addition to the global initiatives, Africa and SA have developed and committed to programmes, policies and interventions such as the Tshwane declaration, Roadmap of Nutrition in South Africa, Campaigns on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA) and the Strategic Plan for Maternal, Newborn, Child and Women’s Health (MNCWH). All these initiatives, health programmes, policies and interventions recognise the important role of breastfeeding in optimising the health and development of children. Moreover, they create a network for governments to identify challenges in their policies and guidelines related to maternal, newborn and child health and provide guidelines on how to improve them (de Graft-Johnson *et al*., 2017; Perrine *et al*., 2012; DoH. 2011). Despite all these interventions, health programmes, policies and initiatives, the EBF and overall breastfeeding rates in many countries, including SA, remain alarmingly low (Edwards *et al*., 2015; DoH, 2012).

2.4 Exclusive breastfeeding rates

EBF rates of infants up to age 6 months in low and middle-income countries are only about 40% (Kimani-Murage *et al*., 2015), while in the United States (US), only 18.8% of infants 0-6 months are exclusively breastfed. Breastfeeding initiation rates are high, but more than half of mothers wean earlier than recommended (Stuebe, 2016). According to a survey done by the Centers for Disease Control and Prevention (CDC) in 2005, 43% of infants received breastmilk beyond 6 months, but only 23% were exclusively breastfed for the first 6 months. EBF was only 33% at 3 months and 14% at 6 months. Most women stopped EBF within 2 weeks after delivery (Bernaix *et al*., 2010). A 2007 CDC survey reported that 74% of infants were being breastfed at hospital discharge, 43% at 6 months, and 21% at 12 months. At 3 months, however, only 31% of these US infants were exclusively breastfed and 12% at 6 months (O'Connor *et al*., 2011). EBF rates in countries in central and Eastern Europe vary from 20% to 44% (Alamirew *et al*., 2017). Ireland has one of the lowest breastfeeding initiation rates in Europe at only 55% (Whelan & Kearney, 2015).

The 2013 Nigeria Demographic and Health Survey reported that only 17% of infants 0-6 months are exclusively breastfed in Nigeria, while 69% of infants are mixed fed (plain water or non-milk liquids such as juice, clear broth and other liquids in addition to breastmilk) (Samuel *et al*., 2016). According to the 2016 South Africa Demographic and Health Survey (SADHS, 2016), 32% of infants 0-6 months were exclusively breastfed, while 14% of infants 0-6 months received plain water, 1% non-milk liquids, 11% other milk, and 18% complementary food in addition to breastmilk. A quarter of infants 0-6 months were not breastfed at all. The percentage of exclusively breastfed infants decreased from 44% at 0-1 months of age to 24% at 4-5 months of age, while 45% of infants under the age of 6 months were bottle fed and 47% of children 12-17 months and 19% of children 18-23 months were breastfed. According to a study done in four provinces to assess breastfeeding practices, 17% of mothers introduced complementary food before one month of age (Siziba *et al*., 2015). Table 2.1 summarises the most recent age-related breastfeeding practices in South Africa (DOH, 2016).

Table 2.1: Breastfeeding status by age (DOH, 2016)

	Breastfeeding Status										
Age in months	**Not breastfeeding (BF)**	**Exclusively BF**	**BF and consuming plain water only**	**BF and consuming non-milk liquids**	**BF and consuming other milk**	**BF and consuming complementary foods**	**Total**	**% currently BF**	**Number of youngest children under age 2 living with the mother**	**% using a bottle with a nipple**	**Number of all children under age 2**
0-1	19.2	44.0	14.0	1.2	14.9	6.7	100.0	80.8	110	47.3	115
2-3	28.9	28.2	6.7	0.4	11.0	24.9	100.0	71.1	110	52.2	120
4-5	27.2	23.7	19.5	0.4	8.5	20.8	100.0	72.8	125	35.4	128
6-8	40.8	4.9	0.7	1.3	5.1	47.2	100.0	59.2	146	55.0	165
9-11	42.5	0.0	0.0	0.0	2.1	55.4	100.0	57.5	143	52.5	160
12-17	53.3	0.4	0.3	0.0	0.1	46.0	100.0	46.7	311	50.0	360
18-23	81.5	0.1	0.0	0.0	0.0	18.4	100.0	18.5	267	38.5	317

Note: Breastfeeding status refers to a 24-hour period (yesterday and last night). Children who are classified as breastfeeding and consuming plain water only, consumed no liquid or solid supplements. The categories of not breastfeeding, exclusively breastfeeding, breastfeeding and consuming plain water, non-milk liquids, other milk, and complementary foods (solids and semi-solids) are hierarchical and mutually exclusive, and their percentages add to 100 percent. Thus children who receive breast milk and non-milk liquids and who do not receive other milk and who do not receive complementary foods are classified in the non-milk liquid category, even though they may also get plain water. Any children who get complementary food are classified in that category as long as they are breastfeeding as well.

1 Non-milk liquids include juice, juice drinks, or other liquids.

2.5 Benefits of breastfeeding

Numerous studies have confirmed the benefits of breastfeeding, with EBF being even more beneficial than partial breastfeeding (Ramakrishnan *et al*., 2014).

The benefits of breastfeeding include nutrition and immunological protection for the infant and numerous benefits for the mother. Breast milk contains all the necessary nutrients in the exact quantity that is needed by an infant during the first 6 months of life (Alamirew *et al*., 2017, Archer *et al*., 2017). Other benefits for the infant include a reduced prevalence of otitis media, asthma, respiratory tract infections, bronchiolitis, gastroenteritis, atopic dermatitis, inflammatory bowel disease, obesity, type 1 and 2 diabetes, necrotising enterocolitis, leukemia, and mortality (sudden infant death syndrome) (Hansen, 2015; Stuebe, 2014; Heymann & Earle, 2013; Handa & Schanler, 2013; Mclnerny, 2014; Nesbitt *et al.,* 2012; Cockerham-Colas *et al*., 2012).

In addition, breast milk promotes sensory and cognitive development, improved school attendance and a higher intelligence quotient (IQ). Breastfeeding establishes and promotes a tremendous bonding between mother and baby, having a lifelong impact on both (Archer *et al*., 2017; Hansen, 2015; Heymann & Earle, 2013; Mclnerny, 2014; Nesbitt *et al.,* 2012).

For mothers, breastfeeding is associated with decreased risk of breast and ovarian cancer, hypertension, diabetes, osteoporosis and heart attack (Stuebe, 2014; Heymann & Earle, 2013; Mclnerny, 2014; Cockerham-Colas *et al*., 2012; Nesbitt *et al.,* 2012). Mothers who never initiate breastfeeding or who wean early, have an increased risk of postpartum depression (Handa & Schanler, 2013; Nesbitt *et al.,* 2012). Thus, breastfeeding should not only be regarded as purely a lifestyle choice, but rather a critical health issue and therefore should receive adequate support, promotion, protection and endorsement (Handa & Schanler, 2013; Mclnerny, 2014).

2.6 The role of healthcare facilities and healthcare workers in the initiation, duration and support of breastfeeding

Both healthcare services (especially antenatal care), and HCWs play a key role in the initiation, duration and support of breastfeeding. Supportive breastfeeding policies in healthcare facilities also play a crucial role in the initiation and duration of breastfeeding (de Graft-Johnson *et al*., 2017). Changes in hospital policies such as implementation of the BFHI, and the encouragement and support of breastfeeding protocols, have been reported to improve breastfeeding initiation rates in hospitals (Kimanii-Murage *et al*., 2015; de Graft-Johnson *et al*., 2017; de Jesus *et al*., 2016; du Plessis & Pereira, 2013). The first national Maternity Practices in Infant Nutrition and Care Survey was undertaken by the CDC in 2007 and showed that many facilities provide maternity care that is not evidence-based and may have a negative impact on breastfeeding (Bernaix *et al*., 2010).

Support and encouragement from well-trained HCWs can positively influence breastfeeding initiation and duration and therefore how infants are fed (Siziba *et al*., 2015; Kimani-Murage *et al*., 2015; van der Merwe *et al*., 2015; Brittin, 2015; de Almeida *et al*. 2015; Whelan & Kearney, 2015; du Plessis, 2013; Ramakrishnan *et al*., 2014; Radaelli G *et al*., 2012; Bernaix *et al*., 2010; Creedy *et al*., 2008). It is important for all HCWs, including doctors, nurses, midwives, obstetricians, and paediatricians,

to serve as advocates and supporters for breastfeeding, as mothers want support not only from midwives and public health nurses but also other health care professionals (Whelan & Kearney, 2015; Mclnerny, 2014; Handa & Schanler, 2013). Numerous studies have reported that the most significant determining factor for a mother to breastfeed or not, was the quality of the breastfeeding instruction, support and encouragement received from HCWs (Samuel *et al*., 2016; de Graft-Johnson *et al*., 2017; Handa & Schanler, 2013; Bernaix *et al*., 2010).

Breastfeeding is a learned skill and mothers look to HCWs as a source of knowledge, trust their advice and depend on skilled support during the early postnatal period (Whelan & Kearney, 2015; de Almeida *et al*., 2015). According to Mass (2015), women who receive negative breastfeeding messages from HCWs are more likely to discontinue breastfeeding. Seventy percent of mothers who perceived their physician as supporting breastfeeding were still breastfeeding at 6 weeks compared with 54% who perceived that the physician had no preference and 9% who believed their physician favoured formula milk (Mass, 2015). One of the main causes of early weaning is the lack of accurate information and support from HCWs and their recommendation to wean (de Almeida *et al*., 2015). The influence of the HCWs on breastfeeding success cannot be underestimated, as the effect of uninformed or misinformed advice and support given to breastfeeding mothers can have a negative effect on breastfeeding success (Mass, 2015). Inaccurate or inappropriate advice from HCWs, and lack of access to HCWs adequately trained in lactation management, are factors that contribute to failure to achieve successful lactation management (Videlefsky *et al*., 1996).

In retrospect, many mothers feel that healthcare services and HCWs failed them at a time when they needed breastfeeding support and assistance (de Almeida *et al*., 2015; Edwards *et al*., 2015; McInnes & Chambers, 2008).

2.7 Inadequate training of healthcare workers

Despite the important influence of HCWs, studies show that HCWs are often inadequately trained and educated to promote breastfeeding (de Almeida *et al*., 2015; Handa & Schanler, 2013). Various specialties, including obstetricians, paediatricians, general practitioners and nurses/midwives report a lack in breastfeeding education, skills, experience and confidence to support breastfeeding parents (Cunningham *et*

al., 2018; Deloian *et al*., 2015; Handa & Schanler, 2013; Davis *et al*., 2012). In the US, 73% of paediatricians reported that they had not received adequate training to support breastfeeding mothers (Cockerham-Colas *et al*., 2012).

Breastfeeding education of HCWs varies widely in terms of the amount of training received, scope, orientation and philosophical model applied (Brittin, 2015; Blacher, 2014; Henney, 2011; Spiby *et al*., 2009). Inadequate training and education of HCWs are a major and concerning barrier to successful initiation and continuation of breastfeeding. Research has identified a clear need for training of all HCWs about breastfeeding, according to their specific professional requirements for knowledge and skills to support breastfeeding (Whelan & Kearney, 2015). UNICEF states that training of HCWs can reduce inconsistencies of practice among HCWs, and also encourage EBF and duration of breastfeeding (Cunningham *et al*., 2018; du Plessis & Pereira, 2013). The need for better education is highlighted in the Surgeon General's 2011 Call to Action to Support Breastfeeding that recommends breastfeeding education for all HCWs caring for mothers and infants (Deloian *et al*., 2015). Better training of HCWs during undergraduate studies as well as during in-service training is thus needed (DoH, 2012).

2.8 Knowledge, Attitudes and Practices of healthcare workers

A lack of breastfeeding support by doctors, nurses, and other hospital staff, advice that may not be evidence-based from HCWs, and poor access to HCWs that are trained in lactation management contribute to unsuccessful lactation management (de Almeida *et al*. 2015). Mothers have described support from HCWs as "uncaring, routine, distant, standardised or rushed". Mothers have also reported receiving conflicting advice, cryptic messages and support from HCWs. Reasons for these findings have been cited as differences in disciplines involved, a lack in training, skills and knowledge to assist mothers with breastfeeding and the different approaches of HCWs to breastfeeding (e.g. a medicalised approach that treats breastfeeding as a medical problem without justification resulting in the disruption of normal biological functioning versus a more natural holistic approach) (Whelan & Kearney, 2015). Some HCWs consider breastfeeding to be a natural life event where others criticise it for becoming too medicalised (Whelan & Kearney, 2015). HCWs who are not regularly updated on the current research on breastfeeding are unable to provide the services

that mothers with newborn babies require, and in this way contribute to the problem of low breastfeeding rates.

2.8.1 Knowledge of healthcare workers

Bernaix *et al.* (2010) have reported that the knowledge of the HCWs is the most important influencing factor in their support given to breastfeeding. Knowledge should be accurate and adequate for them to protect, promote and support breastfeeding (O'Connor *et al*., 2011; Bernaix *et al*., 2010). Over the years, a lack of breastfeeding knowledge among a variety of HCWs, including general practitioners, paediatricians, obstetricians, midwives and nurses has been confirmed in numerous studies, despite numerous calls to action for improving breastfeeding education of HCWs (Archer *et al*., 2017; Kimani-Murage *et al*., 2017; O'Connor *et al*., 2011). Lack of knowledge about breastfeeding is thus a major barrier to breastfeeding support (Adeyemi & Oyewole, 2014). Mass (2015) reported that 55% of HCWs in the US believed that formula milk is an acceptable feeding option and will not harm the infant. In the same study, physicians reported that they are hindered by their own inadequate knowledge (Mass, 2015).

A survey done in 1995 in the US was repeated in 2005 and found the same results, namely that 45% of paediatricians believed that breastfeeding and formula feeding were equally acceptable infant feeding methods (Handa & Schanler, 2013). Another study conducted by Spear (2004) in the US on the knowledge of nurses about breastfeeding, reported poor knowledge of the nutritional value of breast milk among nurses. A large percentage (41.9%) believed that breastmilk and formula milk had the same nutritional value (Bernaix *et al*., 2010). Numerous other studies have confirmed that the breastfeeding knowledge of HCWs is often inadequate (Bernaix *et al*., 2008; Gagnon *et al*., 2005; Spear, 2004; Bernaix, 2000). A decrease in breastfeeding knowledge amongst HCWs, including midwives, since their initial education has been reported and ascribed to a lack of participation in breastfeeding education as part of their continuing professional development (Creedy *et al*., 2008).

In the African context, a recent study conducted by de Graft-Johnson *et al.* (2017) in 6 Sub-Saharan African countries in a total of 643 health facilities, including hospitals and health centres, to establish HCWs knowledge about the 10 Steps to Successful Breastfeeding, found that only 50% of the HCWs were able to report at least one step.

Gaps in knowledge were observed in all countries (de Graft-Johnson *et al*., 2017). In the 1990's, a lack of knowledge was reported among paediatricians, family physicians, obstetricians, and residents in their field in the management of mastitis, poor milk supply and poor weight gain in infants (de Graft-Johnson *et al*., 2017). In a 2009 group evaluation of the knowledge of breastfeeding of paediatricians and obstetricians, it was stated that the physician did not feel comfortable with breastfeeding and did not have adequate knowledge about breastfeeding (de Graft-Johnson *et al*., 2017). In a study conducted by Samuel *et al.* (2016) in Nigeria, it was reported that only 4.8% of HCWs could list 3 advantages of breastfeeding for the baby, only 29.8% mentioned 3 advantages of breastfeeding for the mother, 17.7% could list 3 breastfeeding difficulties and only 3.2% could mention 3 ways of managing these difficulties (Samuel *et al*., 2016). In the same study, only 12.9% stated that mothers infected with HIV should breastfeed and 55.6% believed that the infant should receive complementary foods whenever the infant is ready. Although general EBF knowledge of HCWs was adequate, in-depth knowledge of specific aspects was inadequate (Samuel *et al*., 2016). Another study undertaken in Nigeria also reported that the knowledge of HCWs about breastfeeding was lacking (Adeyemi & Oyewole, 2014). A study conducted to asses HCWs breastfeeding knowledge in a high HIV prevalence area in SA revealed outdated knowledge that was not in line with the WHO current recommendations at that time (Robb *et al*., 2018).

2.8.2 Attitudes of healthcare workers

Attitude (whether the professional believes in breastfeeding or not) towards breastfeeding determines whether the HCWs will acquire knowledge and provide support regarding breastfeeding (Whelan & Kearney, 2015). Attitudes of HCWs toward breastfeeding differ between professions, with physicians and professors showing more negative attitudes toward breastfeeding than nurses (de Almeida *et al*., 2015). Different attitudes among HCWs about breastfeeding and disagreement about role management thereof, have been reported to exacerbate the problem of low global breastfeeding rates (Videlefsky *et al*., 1996).

A study conducted in Nevada to determine HCWs attitudes toward breastfeeding showed no improvement over the past ten years, despite the dramatic increase in breastfeeding promotion (Sigman-Grant & Kim, 2015). A study undertaken among

obstetricians in Canada reported that only 56% felt confident in their ability to support breastfeeding mothers and only 16% believed that they received adequate training on breastfeeding support (Simard-Émond *et al*., 2011). A qualitative study done in the US, reported that paediatricians and obstetricians felt their breastfeeding supportive roles should be minimal due to their busy schedules. They further reported that their support of breastfeeding should be minimal to avoid making mothers that did not breastfeed feel guilty (Sizibia *et al*., 2015; Ramakrishnan *et al*., 2014). Studies have reported that nurses' failure to "buy into" the importance of promoting and supporting breastfeeding, using personal experience and not relying on current evidence-based research have been cited as reasons why mothers do not breastfeed. Formula supplementation, concern of mothers' fatigue and frustration, believing that breastfeeding support is not part of their responsibilities and the fear of taking away a mothers' freedom to choose, are also reasons reported why mothers do not breastfeed (Bernaix *et al*., 2010). In a study to assess HCWs attitudes towards extended breastfeeding in US, the overall attitudes were described as negative. There was a clear decline in support for breastfeeding as children grow older. Only 35% and 65% of HCWs respectively encouraged weaning at age 1-2 years and at age 3-4 years, while 55% and 18% of HCWs believed breastfeeding does not benefit the physical health of 1-2 and 3-4 year-old children (Cockerham-Colas *et al*., 2012). General practitioners (GPs) in Ireland felt that breastfeeding is not their concern as it is not a medical issue, unless a complication such as mastitis occurs. These GPs lacked confidence to promote and support breastfeeding because of their inadequate knowledge. Among midwives in Ireland, a lack of time to provide breastfeeding support was reported (Whelan & Kearney, 2015).

According to a 2000 paediatrician survey in 6 countries in Africa, 21% of paediatricians felt that breastfeeding training during their residency was lacking and 75% of male and 64% of female paediatricians lacked confidence to manage breastfeeding problems (de Graft-Johnson *et al*., 2017). A study undertaken in 1996 in South Africa about the knowledge attitudes and practices of HCWs (obstetricians and paediatricians) in Johannesburg, reported that HCWs did not follow the WHO/UNICEF guidelines and that the HCWs were not "baby friendly" (Videlefsky *et al*., 1996). In general, HCWs reported that they lacked confidence, knowledge and experience to provide breastfeeding support and felt unsure about whether their advice would be beneficial

(Ramakrishnan *et al*., 2014). Their personal experiences influenced the support and information that they provided to mothers (Adeyemi & Oyewole, 2014).

2.8.3 Practices of healthcare workers

Numerous studies undertaken in a variety of countries report that mothers did not receive the breastfeeding support that they expected from HCWs, they received very little breastfeeding information, conflicting advice and inadequate or no antenatal discussion about breastfeeding (Creedy *et al*., 2008). This is confirmed by Cunningham et al., (2018) who reported that the approaches of nurses in practice and philosophies to breastfeeding are inconsistent (Cunningham *et al*., 2018).

Simard-Émond *et al.* (2011) reported that only 49% of Canadian obstetricians routinely offered breastfeeding counselling (Simard-Émond *et al*., 2011). Furthermore, Mass (2015) reported that in the US, only 16% of mothers had discussed breastfeeding with their obstetrician (Mass, 2015). A survey conducted in 2004 reported that 91% of obstetricians and 97% of paediatricians said they discussed what mothers would do once they had to return to work, while only 55% of mothers reported discussing it with their physician (Handa & Schanler, 2013). A study conducted to assess the practices of physicians related to breastfeeding, reported that less than 50% of physicians explained the correct technique of breastfeeding and correct management of major lactation problems (de Almeida *et al*. 2015). Archer *et al.* (2017) found that 36% of mothers reported that they had not received breastfeeding support within 48 hours after delivery and 33% had not received breastfeeding support at all (Archer *et al*., 2017). A survey in Italy among family paediatricians found that paediatricians' practices do not comply with the current WHO recommendations, with 95% of paediatricians suggesting introducing complementary foods at 4-6 months of the infant's age (Radaelli *et al*., 2012).

De Graft-Johnson *et al.* (2017) reported that only 43% of all mothers received assistance to initiate breastfeeding within the first hour after birth, and only 45% were placed skin-to-skin immediately after birth in Ethiopia, Kenya, Madagascar, Mozambique, Rwanda and Tanzania (de Graft-Johnson *et al*. 2017). In the same study, early initiation of breastfeeding and skin-to-skin contact was observed in fewer than three quarters of births (de Graft-Johnson *et al*., 2017). In Nigeria, HCWs perceptions such as insufficient breast milk were reported as the main reason that

HCWs chose to use pre-lacteal feeds (Adeyemi & Oyewole, 2014). The older Johannesburg study, found that 44% of the obstetricians and 50% of the paediatricians advised mothers who had a vaginal delivery to introduce breastfeeding within half an hour after birth, whereas 60% of obstetricians and 55% of paediatricians advised mothers who had a caesarean section to introduce breastfeed 4 hours after birth. Furthermore, about a third (35%) of obstetricians and 15% of paediatricians recommended additional water or dextrose feeds, while 37% of obstetricians believed it is necessary for breastfed infants to be supplemented with formula milk soon after birth. This view was shared by only 4% of paediatricians. In the past, 11% of obstetricians and 8% of paediatricians provided free samples of formula milk to their patients. Almost forty percent (39%) of obstetricians and 48% of paediatricians believed in time limited feeds. More than half (66%) of obstetricians and 88% of paediatricians recommended EBF for at least 4 months and 71% of obstetricians and 84% of paediatricians recommended breastfeeding for at least 9 months. In South Africa, twenty percent of obstetricians recommended introducing solids before 3 months of age. An alarmingly high percentage of obstetricians (78%) and 63% of paediatricians, would recommend formula milk supplementation at two weeks of age if the infant had not regained birth weight. Only 29% of obstetricians and 20% of paediatricians would advise mothers against the use of pacifiers or bottles (Videlefsky *et al*., 1996).

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this chapter the study design, population and sampling, methodology and procedures that were applied in the study are described (Figure 3.1). A description of validity and reliability of the tools, statistical analysis and ethical considerations is also included.

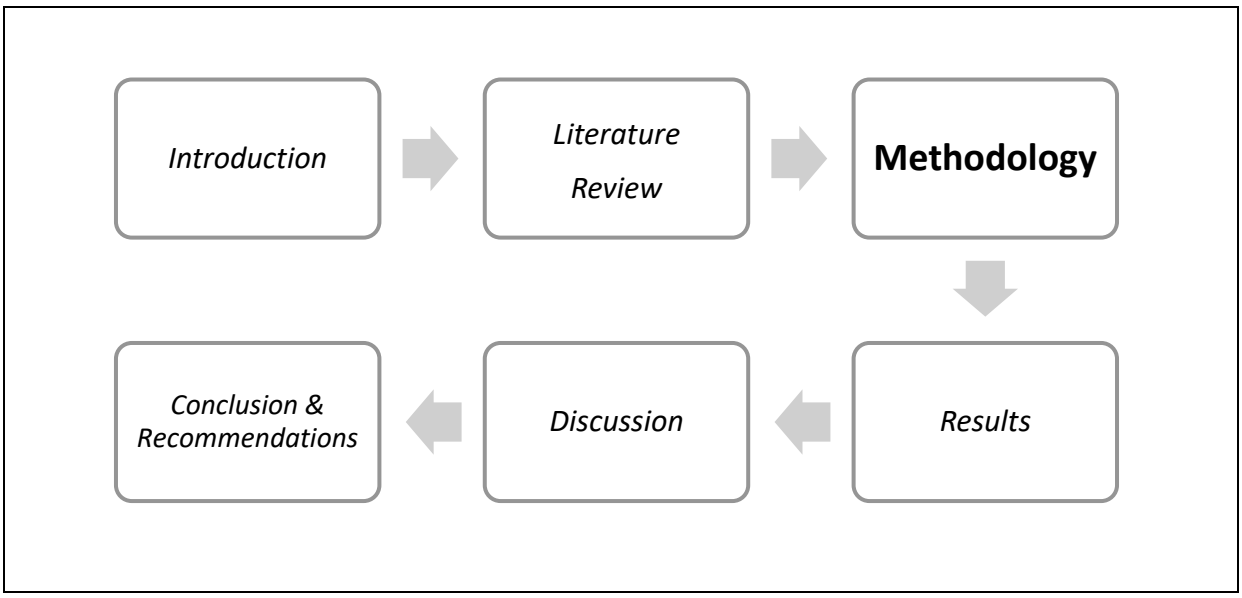

Figure 3.1: Progression of the study: Methodology

3.2 Study design

This study was designed as a quantitative cross-sectional study. Quantitative research involves research that generates knowledge to supply evidence for improving practice (Botma *et al*., 2010. A quantitative research design was chosen for this study since the KAP related to breastfeeding was determined and analysed in a sample of HCWs. Numerical data collected from the subgroups of HCWs by means of questionnaires were compared using statistical analysis. Since groups were compared the design is not only descriptive, but cross-sectional in nature.

3.3 Sample

3.3.1 Population

The study population included paediatricians, obstetricians, general practitioners and midwives working in the private and public health care sectors in the Motheo district, Free State who are registered with the Health Professions Council of South Africa (HPCSA) and South African Nursing Council (SANC). According to HPCSA registration statistics for the **Free State** at 02 August 2018, there were 62 paediatricians, 48 obstetricians and 1083 general practitioners. According to the December 2017 SANC statistics there were 8056 registered nurses in the Free State. Informational data for registered midwives were not available. The researcher had personal communication with the president of the Society of Midwives of South Africa (SOMSA) during which it was communicated that there is no information available about registered midwives as midwives are not obligated to register with SOMSA. Although they are obligated to register with SANC, they register as nurses and not midwives, making it difficult to distinguish between the different categories of nurses.

Health facilities where babies are born in the Motheo district include:

- Pelonomi Academic Hospital;
- Netcare Pelonomi Hospital;
- National District Hospital;
- Mediclinic Bloemfontein;
- Life Rosepark Hospital;
- Universitas Private Hospital;
- Universitas Academic Hospital;
- 3-Military Hospital;
- Busamed Bram Fischer International Airport Hospital
- Mangaung University Community Partnership Program (MUCPP);
- Botshabelo District Hospital;
- Dr JS Moroka;
- Ladybrand Provincial Hospital; and
- Senorita Ntlabathi District Hospital.

The seven health facilities that were randomly selected for inclusion in the current study by the Department of Biostatistics included:

- Netcare Pelonomi Hospital;
- National District Hospital;
- 3-Military Hospital;
- Life Rosepark Hospital;
- Busamed Bram Fischer International Airport Hospital
- Botshabelo District Hospital; and
- Dr JS Moroka

3.3.2 Sample selection

Half of the 14 mentioned facilities, thus 7, were randomly selected to be included in the study by the biostatistician. All relevant health practitioners working in these facilities were eligible to participate.

Based on the publication by Pattinson (2015) related to the **staffing norms in maternity facilities**, the following average numbers can be expected **in state facilities**:

Community Health Centres:	53
District hospitals:	63
Regional hospitals:	13
Provincial tertiary hospitals:	4

In terms of **private facilities** the following numbers of staff work in **maternity wards** in **Bloemfontein:**

General practitioners:	69
Paediatricians:	11
Obstetricians:	16
Midwives:	13

3.3.2.1 Medical doctors

The researcher made use of Medpages (where doctors voluntarily include their contact details) to identify doctors that met the inclusion criteria. These doctors were contacted via e-mail or telephone to invite them to participate in the study. Hereafter, snowball sampling was applied to procure additional participants by asking doctors to forward the email to other doctors.

Secondly, doctors working at the seven health facilities that were randomly selected (this was required to identify midwives), were also invited to participate in the study.

3.3.2.2 Midwives

Midwives meeting the inclusion criteria and working at the randomly selected facilities in the Motheo district were all invited to participate in the study.

3.3.2.3 Inclusion criteria

The following HCWs were eligible to participate in the study:

- HPCSA registered obstetricians, paediatricians that see infants and children and GPs;
- SANC registered midwives;
- Currently practicing in the private, academic or public sector in the Motheo district, Free State; and
- Providing consent to participate in the study.

3.3.2.4 Exclusion criteria

Paediatricians working in specialities not related to infant feeding were excluded.

3.4 Measurements

3.4.1 Operational definitions

The following information was gathered from HCWs:

- Demographic information;

- Knowledge, attitudes and practices regarding breastfeeding;

Operational definitions of each of these variables follow:

3.4.1.1 Demographic information

Demographic information included gender, birth date, profession, place of work and the time period of practicing in specific speciality.

3.4.1.2 Knowledge, attitudes and practices regarding breastfeeding

In order to determine knowledge, attitudes and practices of HCWs, assessments of the following were included:

Breastfeeding knowledge of HCWs of the following topics were assessed: exclusive breastfeeding, continued breastfeeding and complementary feeding, management of breastfeeding, the benefits of breastfeeding, contra-indications to breastfeeding, breastfeeding in the context of HIV, the phases of lactogenesis, the 10 Steps to Successful Breastfeeding and IYCF recommendations.

Attitudes of HCWs were explored by asking questions about opinions or attitudes towards certain aspects of breastfeeding, confidence to support, assist and give mothers breastfeeding advice and breastfeeding training that had been received.

Practices of HCWs were investigated by asking questions about the actions and recommendations of HCWs in certain situations e.g. whether a baby didn't regain birth weight at two weeks, mother's experiencing painful nipples, mother's experiencing low milk production etc.

3.4.2 Techniques

3.4.2.1 Questionnaire

A self-administered questionnaire (Appendix A) was used to obtain the necessary information from HCWs. The questionnaire was developed by the researcher, based on a thorough literature review and taking into consideration the objectives of the

study. The following guidelines were used as the basis for the questions included in the questionnaire:

The 2016 WHO Infant and Young Child Feeding guidelines (WHO, 2016); and

The 2018 Mother-Baby Friendly Initiatives' 10 Steps to Successful Breastfeeding (WHO, 2018).

The questionnaire was available in both electronic and hard copy format (see sampling). The electronic questionnaire was formulated using SurveyMonkey.

3.4.3 Measurement and methodology errors

3.4.3.1 Measurement

Validity refers to the extent to which a research procedure measures what it is supposed to measure (Leedy & Ormrod, 2013). Reliability refers to the degree to which the same results can be reproduced after repeating the measurement (Leedy & Ormrod, 2013). Validity was improved by ensuring that all questions were based on an in-depth literature review concerning IYCF and were motivated by scientific evidence and recommendations. Since the questionnaire aimed to evaluate compliance with the 2016 WHO IYCF guidelines and the 2018 MBFI 10 Steps to Successful Breastfeeding, questions were based on each guiding principle and recommendation.

3.4.3.2 Methodology errors

An adequate response rate was required in order to obtain an accurate representation of the population of HCWs for the study. This possible error was overcome by contacting as many medical doctors as possible via Medpages and using snowball sampling to reach more doctors. In addition, all midwives and medical doctors working at the selected healthcare facilities were invited to participate in the study. In order to encourage participation, a small incentive was offered. Two vouchers to the value of R250 from Woolworths (one for each group of HCWs) were available for those participants that agreed to provide their contact details on a separate form after completing the questionnaire (this was not mandatory) who were included in a lucky draw.

Response error could arise as the questionnaire was self-administered This possible error was overcome by doing a pilot study to ensure that all the questions were clear and understandable.

To ensure data integrity, all data was transferred to an excel file by the researcher in duplicate. These two files were verified by the biostatistician before analyses.

3.4.4 Pilot study

A pilot study was undertaken before the main survey to determine whether the questions were easy to understand. A sample of two paediatricians, two general practitioners, two obstetricians and three midwives were included in the pilot study. An electronic questionnaire was sent via email to the doctors, whilst a paper questionnaire was given to the midwives to complete. After the pilot study, no alterations to the questionnaire were necessary and thus the results of the pilot study data could be included in the main study results.

3.4.5 Data collection process

Approval for the study was obtained from the Health Sciences Research Ethics Committee of the University of the Free State (Appendix B). Approval was also obtained from the Free State Department of Health and the Chief Executive Officers of the hospitals/ facilities included in the study.

Before the start of the study, the pilot study was undertaken in order to determine whether the questionnaire was easily understood.

A statement of consent to participate was displayed on the first page of the questionnaire. By agreeing to complete the questionnaire the participant provided consent. Instructions were included as well as the telephone number of the researcher in case of any questions regarding the study.

Questions related to socio-demographic information and KAP regarding breastfeeding of HCWs were collected by self-administered questionnaires.

All participants who wished to be included in the lucky draw were asked to complete a separate form with their name and telephone numbers after completion of the questionnaire. Winners were randomly selected at the end of the study.

3.4.5.1 Electronic survey

Email addresses of HCWs were obtained via Medpages and then through snowball sampling. An e-mail explaining the study was sent to medical practitioners who could then click on a link to the electronic questionnaire. E-mail addresses were de-linked from the survey.

3.3.5.2 Paper-based survey

A paper copy of the questionnaire was distributed to all the midwives and medical doctors working at the identified facilities. Questionnaires were completed anonymously (no names were indicated) to ensure confidentiality. After completion of the questionnaire, HCWs left their questionnaires in a central box that was placed at each facility by the researcher.

3.5 Statistical Analysis

Descriptive statistics, namely frequencies and percentages for categorical data and means and standard deviations or medians and percentiles for numerical data, were calculated. Associations between the professions and variables were calculated and described by means of the Kruskal-Wallis test for numerical data and Fisher's exact test for categorical data.

All analyses were performed by the Department Biostatistics at the University of the Free State using SAS Software.

3.7 Ethical Aspects

Approval for this research was obtained from the Health Sciences Research Ethics Committee of the University of the Free State, the Free State Department of Health and the Chief Executive Officers of the hospitals/ facilities.

All participants received an information leaflet or e-mail explaining the purpose and procedures of the study. A statement at the beginning of the questionnaire explained that consent was implied by completing the questionnaire. Participants were under no

obligation to participate in the study and questionnaires were completed anonymously. The questionnaire and competition form could not be linked.

Storage and destroying of data: All hard copy questionnaires are stored in a locked cupboard that only the researcher has access to, while electronic questionnaires are stored in an electronic folder that is password protected. Questionnaires will be destroyed after a period of 10 years.

CHAPTER 4

RESULTS

4.1 Introduction

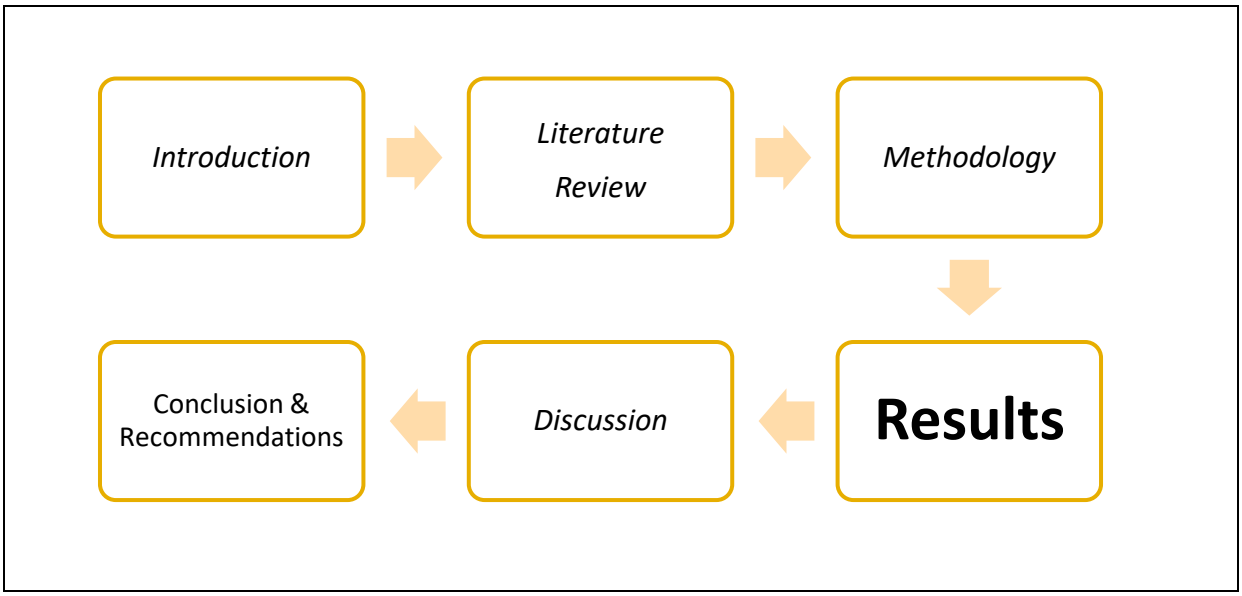

Figure 4.1: Progression of the study: Results

Figure 4 gives an overview of the progression of the study in terms of the results.

4.2. Demography of participants

A total of 117 HCWs participated in the present study of which 10 were paediatricians, 8 obstetricians, 71 general practitioners (GPs) and 28 midwives.

The median age of the participants, was 34.0 years, ranging from 24.4 years to 60.0 years. The median years practicing in the current profession was 7.0 years, ranging from 1.0 year to 31.0 years (Table 4.1). More than half of the participants were female (65.8%) (Table 4.2).The current place of employment of majority of GPs (85.9%) and midwives (82.1%) was in public hospitals, while the majority of the paediatricians (60%) and half of the obstetricians (50%) were in private practice (Table 4.3).

Table 4.1: Median age and years practising in current position

Variable	Paediatricians (N=10)			Obstetricians (N=8)			General Practitioners (N=71)			Midwives (N=28)			Total (N=117)		
	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max
Age	45.3	38.1	65.0	46.0	40.1	50.0	30.1	24.3	58.8	36.0	28.5	57.4	34.0	24.4	65.0
Years practicing in current position	10.0	3.0	22.0	15.0	10.0	20.0	5.0	1.0	30.0	8.0	1.0	31.0	7.0	1.0	31.0

Table 4.2: Gender

Variable	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		Total (N=117)	
	n	%	n	%	n	%	n	%	n	%
Male	7	70.0	6	75.0	25	35.2	2	7.1	40	34.2
Female	3	30.0	2	25.0	46	64.8	26	92.9	77	65.8

Table 4.3: Working environment

Variable	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		Total (N=117)	
	n	%	n	%	n	%	n	%	n	%
Private practice	6	60.0	4	50	0	0.0	0	0.0	10	8.5
Private hospital	3	30.0	3	37.5	10	14.1	4	14.3	20	17.1
Baby clinic	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Public hospital	1	10.0	1	12.5	61	85.9	23	82.1	86	73.5
Clinic	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	1	3.6	1	0.9

4.3 Knowledge of healthcare workers

Although the majority of the total group of HCWs (70%) knew that a breastfeed should not be time limited, a statistically significant difference was observed between the different HCWs. A higher percentage of obstetricians (100%) and midwives (82.1%) were aware of this compared to 40% of paediatricians and 66.2% of GPs (p=0.0015). Less than twenty five percent (23.9%) of GPs knew what the signs are that a baby is getting colostrum at the first breastfeed immediately after birth, compared to 0% of paediatricians, obstetricians and midwives, a difference that was statistically significant (p=0.0002). The majority of HCWs (73%) knew that foremilk is the first milk a baby receives when a mother produces mature breastmilk. Although 100% of paediatricians and obstetricians were aware of this fact, only 67.6% GPs and 25% of midwives knew, indicating a significant difference between HCWs (p=<0001). Most HCWs (92.3%), of which? 100% of paediatricians and obstetricians, 90.1% of GPs and 92.9% of midwives knew that placing a baby in skin-to-skin contact can contribute to the stabilisation of a newborns' blood glucose levels. In contrast, fewer than twenty percent (16.2%) of the total group of HCWs knew what induced lactation is (20% of paediatricians, 0% of obstetricians, 18.3% of GPs and 14.3% of midwives) (Table 4.4).

More than half of the total group of HCWs (59%), 60% of paediatricians, 50% of obstetricians, 61.9% of GPs and 53.6% of midwives were able to define the term "exclusive breastfeeding". When asked up to what age they would recommend exclusive breastfeeding, the majority of GPs (76.1%) and midwives (78.6%) indicated that they recommend exclusive breastfeeding up to the age 6 months, compared to only 10% of paediatricians and 25% of obstetricians. Majority of paediatricians (90%) and obstetricians (75%) recommend exclusive breastfeeding up to the age 4-6 months. In terms of the age up to which HCWs would recommend exclusive breastfeeding, the difference in the responses of HCWs was statistically significant (p<0.0001). All the paediatricians and obstetricians, 76.1% of GPs and 82.1% of midwives knew a baby should breastfeed whenever the baby wants to feed. When asked whether exclusively breastfed babies need additional water, a higher percentage of paediatricians (90%), obstetricians (100%) and midwives (92.9) knew that exclusively breastfed babies do not need additional water compared to only 70.4% of GPs, a difference that was statistically significant (p=0.0488) (Table 4.5).

Table 4.4: General breastfeeding knowledge

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
For how long should a baby breastfeed per feed?	Ten minutes on each breast	0	0.0	0	0.0	2	2.8	3	10.7	0.0015*	5	4.3
	Twenty minutes	0	0.0	0	0.0	10	14.1	0	0.0		10	8.6
	Twenty minutes on each breast	0	0.0	0	0.0	4	5.6	1	3.6		5	4.3
	Twenty – forty minutes	0	0.0	0	0.0	5	7.0	1	3.6		6	5.1
	As long as the baby wants to	4	40.0	8	100	47	66.2	23	82.1		82	70.0
	Other	6	60.0	0	0.0	3	4.2	0	0.0		9	7.7
What signs indicate that the baby is getting colostrum at the first breastfeed immediately after birth? (choose only one)	You must hear the baby suckling and swallowing	3	30.0	0	0.0	17	23.9	5	17.9	0.0002*	25	21.4
	You must hear and see the baby swallowing	0	0.0	0	0.0	17	23.9	0	0.0		17	14.5
	With a strong suckling reflex the cheeks of the baby will be drawn inward	2	20.0	6	75.0	33	46.5	21	75.0		62	53.0
	If the baby suckles for at least 30 minutes without a pause	5	50.0	2	25.0	4	5.6	2	7.1		13	11.1

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
During lactogenesis III (day 8/9 after birth) a mother produces mature breast milk. What is the first milk that a baby receives during a breastfeed?	Colostrum	0	0.0	0	0.0	23	32.4	21	75.0	<0001*	44	37.6
	Foremilk	10	100	8	100	48	67.6	7	25.0		73	62.4
	Hindmilk	0	0.0	0	0.0	0	0.0	0	0.0		0	0.0
	Don't know	0	0.0	0	0.0	0	0.0	0	0.0		0	0.0
The following may contribute to stabilisation of the blood sugar levels of a newborn: (choose only one option)	Wrapping the baby	0	0.0	0	0.0	0	0.0	0	0.0	0.9344	9	7.7
	Placing the baby in an incubator	0	0.0	0	0.0	7	9.9	2	7.1		0	0.0
	Placing the baby in skin-to-skin contact	10	100	8	100	64	90.1	26	92.9		108	92.3
Explain your understanding of "induced lactation"	Incorrect	8	80.0	8	100	58	81.7	24	85.7	0.7007	98	83.8
	Correct	2	20.0	0	0.0	13	18.3	4	14.3		19	16.2

Table 4.5: Knowledge pertaining to exclusive breastfeeding

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		N	%	n	%	n	%	n	%		n	%
Explain your understanding of the term "exclusive breastfeeding"	Correct	6	60.0	4	50.0	44	61.9	15	53.6	0.8225	69	59.0
	Incorrect	4	40.0	4	50.0	27	38.0	13	46.4		48	41.0
Up to what age do you recommend exclusive breastfeeding?	3 months	0	0.0	0	0.0	2	2.8	0	0.0	<.0001*	2	1.7
	4-6 months	9	90.0	6	75.0	13	18.3	5	17.9		33	28.2
	6 months	1	10.0	2	25.0	54	76.1	22	78.6		79	67.5
	Other	0	0.0	0	0.0	2	2.8	1	3.6		2	2.6
How often should an exclusively breastfed baby be breastfed?	Every 2 hours	0	0.0	0	0.0	11	15.5	4	14.3	0.8609	15	12.8
	Every 4 hours	0	0.0	0	0.0	5	7.0	1	3.6		6	5.1
	Whenever the baby wants to feed	10	100	8	100	54	76.1	23	82.1		95	81.2
	Other	0	0.0	0	0.0	1	1.4	0	0.0		1	0.9
Do exclusively breastfed babies need additional water?	Never	9	90.0	8	100	50	70.4	26	92.9	0.0488*	93	79.5
	Seldom	1	10.0	0	0.0	16	22.5	0	0.0		17	14.5
	Sometimes	0	0.0	0	0.0	5	7.0	2	7.1		7	6.0
	Always	0	0.0	0	0.0	0	0.0	0	0.0		0	0.0

When asked about the benefits of breastfeeding, a significantly higher percentage of GPs (60.6%) than paediatricians (30%), obstetricians (25%), and midwives (50%) were able to list three benefits of breastfeeding for the baby (p=0.0180). Although the percentage of HCWs that could list three benefits of breastfeeding for the mother was low (26.7%), a higher percentage of GPs (33.8%) than paediatricians (20%), obstetricians (25%), and midwives (10.7%) were able to list three benefits of breastfeeding for the mother (p=0.0016). When asked whether colostrum alone can satisfy the nutritional needs of a healthy full-term baby, more than half of HCWs (59%) answered correctly. In this regard, 100% of paediatricians and obstetricians, and 67.9% of midwives compared to only 45.1% of GPs agreed (p=0.0105). Less than a quarter of the total group of HCWs (21.4%) knew that breastmilk alone is nutritionally adequate for all full-term healthy infants 0-6 months. When comparing the responses of HCWs, 30% of paediatricians, 25% of obstetricians, 22.5% of GPs, but only 14.3% of midwives, knew that breastmilk alone is nutritionally adequate for all full-term healthy infants 0-6 months (p=0.0038). The majority of HCWs (93.2%), 100% of paediatricians and obstetricians, 88.7% of GPs and 93.2% of midwives knew that infants who are formula/replacement fed have higher risks for infections (diarrhoea, pneumonia, etc.). Furthermore, the majority of HCWs (92.3%), 100% of paediatricians and obstetricians, 88.7% of GPs and 96.4% of midwives respectively, agreed that breast milk promotes sensory and cognitive development, improved school attendance and a higher IQ. Almost ninety percent of HCWs (89.7%), 100% of paediatricians and obstetricians, 88.7% of GPs and 85.7% of midwives, knew that formula milk does not contain the same nutrients as breast milk and is not safe for all babies (Table 4.6).

Less than fifteen percent of the total group of HCWs (14.5%), 30% of paediatricians, 25% of obstetricians, 8.4% of GPs and 25% of midwives were able to name at least one step of the MBFI 10 Steps to Successful Breastfeeding. More than half of HCWs (55.6%), 60% of paediatricians, 75% of obstetricians, 50.7% of GPs and 60.7% of midwives did not know what is acceptable within the scope of the International Code of the Marketing of Breast Milk Substitutes (Table 4.7).

Table 4.6: Knowledge pertaining to the benefits of breastfeeding

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
Name at least 3 benefits of breastfeeding for the baby	Not one correct	0	0.0	3	37.5	9	12.7	2	7.1	0.0180*	14	12.0
	1 correct	0	0.0	0	0.0	4	5.6	5	17.9		9	7.7
	2 correct	7	70.0	3	37.5	15	21.1	7	25.0		32	27.3
	3 correct	3	30.0	2	25.0	43	60.6	14	50.0		62	53.0
Name at least 3 benefits of breastfeeding for the mother	Not one correct	0	0.0	4	50.0	9	12.7	0	0.0	0.0016*	12	10.3
	1 correct	0	0.0.	0	0.0	7	9.9	9	32.1		16	13.9
	2 correct	8	80.0	2	25.0	31	43.7	16	57.1		57	49.1
	3 correct	2	20.0	2	25.0	24	33.8	3	10.7		31	26.7
Colostrum alone can satisfy the nutritional needs of a healthy full-term baby	Strongly disagree	0	0.0	0	0.0	12	16.9	4	14.3	0.0105*	16	13.7
	Disagree	0	0.0	0	0.0	24	33.8	3	10.7		27	23.1
	Not sure	0	0.0	0	0.0	3	4.2	2	7.1		5	4.3
	Agree	10	100	8	100	32	45.1	19	67.9		69	59.0
Choose the CORRECT phrase: (choose only one)	Breastmilk alone is NOT nutritionally adequate for infants from 0-6 months	0	0.0	0	0.0	0	0.0	0	0.0	0.0038*	0	0.0
	Breastmilk alone IS nutritionally adequate for ALL infants 0-6 months	3	30.0	6	75.0	53	74.7	24	85.7		86	73.5
	Breastmilk alone IS nutritionally adequate for all full term healthy infants 0-6 months	3	30.0	2	25.0	16	22.5	4	14.3		25	21.4
	Breastmilk alone IS nutritionally adequate for all full term healthy infants 0-4 months	4	40	0	0	2	2.8	0	0.0		6	5.1
In general, infants who are formula/replacement fed have higher risks for infections	True	10	100	8	100	63	88.7	28	100	0.2452	109	93.2
	False	0	0	0	0	8	11.3	0	0.0		8	6.8
Breast milk promotes sensory and cognitive development, improved school attendance and higher IQ	True	10	100	8	100	63	88.7	27	96.4	0.5355	108	92.3
	False	0	0	0	0	8	11.3	1	3.6		9	7.7
Formula milk contains the same nutrients as breast milk and is safe for all babies	True	0	0	0	0	8	11.3	4	14.3	0.6703	12	10.3
	False	10	100	8	100	63	88.7	24	85.7		105	89.7

Table 4.7: Knowledge pertaining to MBFI

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
Name any 3 of the MBFI '10 Steps to Successful Breastfeeding'	Not one correct	7	70.0	6	75.0	42	59.1	12	42.9	0.1024	67	57.3
	1 correct	0	0.0	0	0.0	11	15.5	6	21.4		17	14.5
	2 correct	0	0.0	0	0.0	12	16.9	3	10.7		15	12.8
	3 correct	3	30.0	2	25.0	6	8.4	7	25.0		18	15.4
According to the International Code of the Marketing of Breast Milk Substitutes it is ACCEPTABLE to: (choose only one option)	Receive samples of infant formula or other products within the scope of this code	0	0.0	0	0.0	3	4.2	1	3.6	0.5880	4	3.4
	Receive financial and/or material inducements to promote products within the scope of this code	0	0.0	0	0.0	0	0.0	2	7.1		2	1.7
	Receive scientific information regarding products within the scope of this code	4	40.0	2	25.0	28	39.4	6	21.4		40	34.2
	None of the above	6	60.0	6	75.0	36	50.7	17	60.7		65	55.6
	All of the above	0	0.0	0	0.0	4	5.6	2	7.1		6	5.1

When asked about factors that could be considered to be contra-indications for breastfeeding, 53% of the total group of HCWs, 90% of paediatricians and 100% obstetricians incorrectly reported that mastitis is a contra-indication for breastfeeding compared to 43.7% of GPs and 50% of midwives (p=0.0006). Three quarters of the total group of HCWs (75.2%), 100% of paediatricians, 75% of obstetricians, 74.6% of GPs and 67.9% of midwives correctly responded that cracked/bleeding nipples is a contra-indication for breastfeeding in HIV-infected mothers. Seventy percent (70.1%) of the total group of HCWs, 60% of paediatricians, 100% of obstetricians, and 78.9% of GPs knew that the use of cytotoxics and antineoplastics is a contra-indication for breastfeeding, compared to only 42.9% of midwives, a difference that was statistically significant (p=0.0007). Less than a quarter of the total group of HCWs (23.1%) knew that galactosemia is a contra-indication for breastfeeding (50% of paediatricians, 75% of obstetricians, 22.5% GPs and 14.3% of midwives) (Table 4.8).

In terms of knowledge pertaining to breastfeeding in the context of HIV, only 6% of the total group of HCWs, none of the paediatricians and obstetricians, 8.4% of GPs and 3.6% of midwives responded that breastfeeding is recommended for an HIV infected mother if the mother is from a lower socio-economic background and does not meet the AFASS (Acceptable, Feasible, Affordable, Sustainable and Safe) criteria. Sixty percent of the paediatricians and 62.5% of the obstetricians responded that breastfeeding should never be recommended for an HIV infected mother. Almost thirty percent of the midwives reported they didn’t know what the AFASS criteria are. Less than fifty percent (46.1%) of the total group of HCWs were aware of the newest 2017 WHO guideline pertaining to HIV and continued breastfeeding up to two years and beyond while being fully supported for ART adherence. Significant differences in the percentage of respondents that were aware of the new guideline were observed with 20% of paediatricians, 37.5% of obstetricians, 49.3% of GPs and 50% of midwives knowing (p=0.0390) (Table 4.9).

Table 4.8: Knowledge pertaining to the contra-indications for breastfeeding

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
Which of the following are contra-indications for breastfeeding? (you can choose more than one option)	Mastitis	9	90.0	8	100	31	43.7	14	50.0	0.0006*	62	53.0
	Cracked/bleeding nipples (HIV -)	0	0.0	0	0.0	7	9.9	5	17.9	0.3999	12	10.3
	Cracked/bleeding nipples (HIV +)	10	100	6	75.0	53	74.6	19	67.9	0.2230	88	75.2
	Tuberculosis	0	0.0	0	0.0	10	14.1	6	21.4	0.2948	16	13.7
	Maternal diabetes	0	0.0	0	0.0	0	0	1	3.6	0.3970	1	0.9
	Rheumatoid arthritis	0	0.0	0	0.0	6	8.4	0	9.0	0.4240	6	5.1
	Epilepsy	3	30.0	0	0.0	3	4.2	2	7.1	0.0561	8	6.8
	Use of cytotoxics and antineoplastics	6	60.0	8	100	56	78.9	12	42.9	0.0007*	82	70.1
	Phenylketonuria	0	0.0	0	0.0	5	7.0	2	7.1	1.0000	7	6.0
	Cytomegalovirus (CMV)	0	0.0	0	0.0	10	14.1	3	10.7	0.6498	13	11.1
	Full-term infant with physiological jaundice	0	0.0	0	0.0	0	0.0	0	0.0	-	0	0.0
	Infants of a diabetic mother	0	0.0	0	0.0	0	0.0	1	3.6	0.3917	1	0.9
	Not regained birth weight by 10 days	0	0.0	0	0.0	0	0.0	0	0.0	-	0	0.0
	Premature infants requiring ICU admission	0	0.0	0	0.0	9	12.7	5	17.9	0.4436	14	12.0
	Infant with Gastroesophageal Reflux disease (GERD)	0	0.0	0	0.0	2	2.8	4	14.3	0.1443	6	5.1
	Secondary lactose intolerance	0	0.0	0	0.0	1	1.4	1	3.6	0.6315	2	1.7
	Galactosemia	5	50.0	2	75.0	16	22.5	4	14.3	0.1432	27	23.1

Table 4.9: Knowledge pertaining to breastfeeding in the context of HIV

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
When is breastfeeding recommended for an HIV infected mother?	Never	6	60.0	5	62.5	2	2.8	0	0.0	<.0001*	13	11.1
	If the mother is from a lower socio-economic background and does not meet the AFASS criteria	0	0.0	0	0.0	6	8.4	1	3.6		7	6.0
	Always, even for mothers from a high socio-economic background who meets the AFASS criteria	3	30.0	3	37.5	54	76.1	19	67.9		79	67.5
	Unsure of what is meant by AFASS	1	10.0	0	0.0	9	12.7	8	28.6		18	15.4
Up to what age of the infant can an HIV infected mother breastfeed according to the newest 2017 WHO guidelines (exclusive plus continued breastfeeding)?	3 months	0	0.0	0	0.0	0	0.0	0	0.0	0.0390*	0	0.0
	4-6 months	2	20.0	0	0.0	5	7.0	3	10.7		10	8.6
	6 months	0	0.0	0	0.0	14	19.7	7	25.0		21	18.0
	8 months	0	0.0	0	0.0	0	0.0	0	0.0		0	0.0
	Up to one year	6	60.0	5	62.5	17	23.9	4	14.3		32	27.3
	Up to 2 years and beyond while being fully supported for ART adherence	2	20.0	3	37.5	35	49.3	14	50.0		54	46.1

4.4 Practices of healthcare workers

When asked how long after birth they would encourage mothers to initiate breastfeeding, 50% of the obstetricians and more than half of paediatricians (60%) encourage mothers to initiate breastfeeding within one hour after birth, compared to the majority GPs (64.8%) and midwives (71.4%) who encourage mothers to initiate breastfeeding within half an hour after birth, a difference that was statistically significant (p=0.0137). If a mother and baby are separated after birth due to an inadvertent situation and the mother is still able to express enough breast milk, 60% of paediatricians and 50% of obstetricians would recommend using formula milk with a cup, compared to 80.3% GPs and 89.3% midwives who recommend breastmilk with a cup as feeding method (p<0001). When a baby is hypoglycaemic, the majority of paediatricians (70%) and obstetricians (87.5%) would recommend oral glucose administration, compared to 57.7% of GPs and 71.5% of midwives who would recommend expressed colostrum with a syringe (p<0001). Less than half the paediatricians (40%) and obstetricians (37.5%) recommended rooming in for 24 hours a day, compared to the majority of GPs (80.3%) and midwives (78.6%) who would recommend rooming in for 24 hours a day (p=0.0152) (Table 4.10).

Less than 30% of the total group of HCWs (28.3%), 20% of paediatricians, none of the obstetricians, 32.4% of GPs and 28.7% midwives recommended continued breastfeeding together with complementary feeding up to 24 months and beyond. Forty percent of paediatricians would recommend continued breastfeeding up to age 12 months. Three quarters of obstetricians (75%) would recommend continued breastfeeding up to age 12 months and 40.8% GPs and 39.3% midwives up to 24 months (Table 4.10).

If a baby did not regain birth weight before 2 weeks of age and the medical examination results are normal, 60% of paediatricians would recommend supplementing with formula, the majority of obstetricians (100%), GPs (60.6%) and midwives (78.6%) would recommend the mother to breastfeed more often and a quarter of HCWs (15.4%) would refer the mother to a lactation specialist. Differences in the responses of different HCWs were found to be statistically significant (p=0.0096). Almost ninety percent (89.7%) of the total group of HCWs, 100% of paediatricians and obstetricians, 88.7% of GPs and 85.7% of midwives would recommend better positioning and

attachment of the baby onto the breast when a mother is experiencing painful nipples. More than half of HCWs (54.7%), 60% of paediatricians, 50% of obstetricians, 52.1% of GPs and 60.7% of midwives would encourage a mother with low milk production to breastfeed more often. When asked whether they would evaluate a breastfeed session to determine correct positioning and attachment, only 20% of paediatricians and 12.5% of obstetricians compared to 39.4% of GPs and 35.7% of midwives responded that they would evaluate a breastfeed session to determine correct positioning and attachment (p=0.0087) (Table 4.10).

The majority of the total group of HCWs (65%), 40% of paediatricians, 50% of obstetricians, 63.4% of GPs and 82.1% of midwives would suggest a breastfeeding support group to mothers on discharge. Very few HCWs (21.4%) of the total group, 30% of paediatricians, none of the obstetricians, 26.8% of GPs and 17.9% of midwives reported that they refer breastfeeding mothers to a lactation specialist. Furthermore, fewer than half of the total group of HCWs (44.4%), 40% of paediatricians, 50% of obstetricians, 42.2% of GPs and 50% of midwives reported providing breastfeeding mothers with a list of resources for breastfeeding help, while 43.7% of HCWs, 40% of paediatricians, 50% of obstetricians, 39.4% of GPs and 50% of midwives refer breastfeeding mothers to a midwife (Table 4.11).

Table 4.10: Practices pertaining to breastfeeding

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
How long after birth do you encourage mothers to initiate breastfeeding?	Within half an hour after birth	4	40.0	1	12.5	46	64.8	20	71.4	0.0137*	71	60.6
	One hour after birth	6	60.0	4	50.0	13	18.3	4	14.3		27	23.1
	Four hours after birth	0	0.0	0	0.0	4	5.6	0	0.0		4	3.4
	Four hours or more after birth	0	0.0	0	0.0	7	9.9	4	14.3		14	12.0
	Other – please comment	0	0.0	3	37.5	1	1.4	0	0.0		1	0.9
Up to what age do you recommend continued breastfeeding together with complementary feeding?	8 months	0	0.0	0	0.0	1	1.4	1	3.6	0.3685	2	1.7
	12 months	4	40.0	6	75.0	16	22.5	7	25.0		33	28.2
	24 months	4	40.0	2	25.0	29	40.8	11	39.3		46	39.3
	24 months and beyond	2	20.0	0	0.0	23	32.4	8	28.7		33	28.3
	Other	0	0.0	0	0.0	2	2.8	1	3.6		3	2.6
If a mother and baby are separated after birth due to an inadvertent situation and the mother is still able to express enough breast milk, what feeding method would you recommend for the infant?	Formula milk with a cup	6	60.0	4	50.0	6	8.4	0	0.0	<0001*	16	13.7
	Breast milk with a bottle	0	0.0	0	0.0	6	8.4	1	3.6		7	6.0
	Breast milk with a cup	4	40.0	2	25.0	57	80.3	25	89.3		88	75.2
	Formula milk with a bottle	0	0.0	2	25.0	2	2.8	2	7.1		6	5.1
What would you recommend when a baby is hypoglycaemic?	Oral glucose administration	7	70.0	7	87.5	13	18.3	2	7.2	<0001*	29	24.8
	Formula milk with a bottle	0	0.0	0	0.0	6	8.4	4	14.3		10	8.6
	Formula milk with a cup	0	0.0	0	0.0	3	4.2	0	0.0		3	2.6
	Expressed colostrum with a syringe	3	30.0	1	12.5	41	57.7	20	71.4		65	55.5
	IV infusion	0	0.0	0	0.0	0	0.0	2	7.1		2	1.7
	Other – please comment	0	0.0	0	0.0	8	11.3	0	0.0		8	6.8
Choose only one of the following:	I recommend rooming in 24 hours a day	4	40.0	3	37.5	57	80.3	22	78.6	0.0152*	86	73.5
	I recommend rooming in for most part of the day but taking the baby to the baby room at night so that the mother can rest	6	60.0	5	62.5	11	15.5	5	17.9		27	23.1
	I do not recommend rooming in at all because mothers tend to struggle to	0	0.0	0	0.0	2	2.8	1	1.4		3	2.5

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
	cope with their babies in the same room											
	Other – please comment	0	0.0	0	0.0	1	3.6	0	0.0		1	0.9
If a baby did not regain birth weight before 2 weeks of age and the medical examination results are normal, what would you recommend?	Supplementing with formula milk	6	60.0	0	0.0	9	12.7	4	14.3	0.0096*	19	16.2
	Stop breastfeeding and give only formula milk	0	0.0	0	0.0	1	1.4	0	0.0		1	0.9
	Encourage the mother to breastfeed more often	2	20.0	8	100	43	60.6	22	78.6		75	64.1
	Refer the mother to a lactation specialist	1	10.0	0	0.0	15	21.1	2	7.1		18	15.4
	Other – please comment	1	10.0	0	0.0	3	4.2	0	0.0		4	3.4
What would you recommend to a mother experiencing painful nipples? (choose only one option)	Use a nipple shield	0	0.0	0	0.0	3	4.2	2	7.2	0.9687	5	4.3
	Temporarily discontinue breastfeeding and formula feed	0	0.0	0	0.0	2	2.8	0	0.0		2	1.7
	Try better positioning and attachment of the baby onto the breast	10	100	8	100	63	88.7	24	85.7		105	89.7
	Push through and continue breastfeeding because breastfeeding is painful during the first few days	0	0.0	0	0.0	3	4.2	2	7.1		5	4.3
What would you recommend to a mother with low milk production? (choose only one option)	Top up with formula milk using a bottle	0	0.0	0	0.0	4	5.6	0	0.0	0.0087*	4	3.4
	Top up with formula milk using a cup	0	0.0	0	0.0	2	2.8	1	3.6		3	2.6
	Encourage her to breastfeed more often	6	60.0	4	50.0	37	52.1	17	60.7		64	54.7
	Encourage her to use galactogogues	2	20.0	3	37.5	0	0.0	0	0.0		5	4.3
	Evaluate a breastfeed session to determine correct positioning and attachment	2	20.0	1	12.5	28	39.4	10	35.7		41	35.0

Table 4.11: Suggested breastfeeding support

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	N	%	n	%		n	%
What support do you suggest to breastfeeding mothers on discharge? (you can choose more than one option)	Breastfeeding support group	4	40.0	4	50.0	45	63.4	23	82.1	0.0551	76	65.0
	Lactation specialist	3	30.0	0	0.0	19	26.8	5	17.9	0.2966	25	21.4
	List of resources for breastfeeding help	4	40.0	4	50.0	30	42.2	14	50.0	0.8692	52	44.4
	Gynaecologist	0	0.0	0	0.0	10	14.1	1	3.6	0.2884	11	9.4
	Paediatrician	1	10.0	0	0.0	8	11.3	3	10.7	1.0000	12	10.3
	General practitioner	0	0.0	0	0.0	8	11.3	0	0.0	0.2419	8	6.8
	Midwife	4	40.0	4	50.0	28	39.4	14	50.0	0.7705	50	43.7
	None	0	0.0	0	0.0	0	0.0	0	0.0	-	0	0.0

4.5 Attitudes of healthcare workers

The majority of HCWs (93.1%), 100% of paediatricians and obstetricians, 95.8% of GPs and 82.1% of midwives believed that uninterrupted skin-to-skin contact immediately after birth helps with the flow of colostrum. Less than half of HCWs (34.2%), 20% of paediatricians, 12.5% of obstetricians, 45.1% of GPs and 17.9% of midwives believe that the separation of a newborn from the mother at birth can cause harmful stress to the baby (Table 4.12).

When asked how confident the HCWs were to successfully show a new mother how to correctly position and attach the baby to the breast for breastfeeding, a significantly higher percentage of midwives (75%) than paediatricians (40%), obstetricians (12.5%) and GPs (25.3%) felt highly confident (p=0.0004). When asked how confident the HCWs were to give mothers breastfeeding advice, a significantly higher percentage of midwives (78.6%) than paediatricians (40%), obstetricians (12.5%) and GPs (39.4%) felt highly confident (p=0.0050). Forty one percent of HCWs, 40% of paediatricians, 12.5% of obstetricians, 40.8% of GPs and 50% of midwives felt highly confident to give mothers advice on how to treat breastfeeding complications e.g. mastitis, bleeding nipples, breast abscess, engorgement, nipple bleb and blocked duct (Table 4.12).

Fifty percent of paediatricians and 37.5% of obstetricians believed there is no harm in the use of pacifiers and/or bottles, compared to the majority of 71.8% GPs and 85.7% midwives who would not recommend the use of bottles and pacifiers, a difference that was statistically significant (p=0.0007) (Table 4.12).

When asked about a frenectomy before the age of 6 months, half of the paediatricians and 75% of obstetricians believed it should never be done, compared to 29.6% of GPs and 25.9% midwives who believed it should be done if either the infant or mother is experiencing breastfeeding difficulties. Thirty percent of paediatricians believed it should be done when the infant is older, a difference that was statistically significant (p<0001) (Table 4.12).

The majority of midwives (78.6%) believe that mothers should feel comfortable to breastfeed in public but should cover herself and her baby while breastfeeding, compared to 60% of paediatricians, 100% of obstetricians and 49.3% of GPs that feel

public breastfeeding is inappropriate, a difference that was statistically significant (p=0.0014) (Table 4.12).

More than half of HCWs (56%), 50% of paediatricians, 87.5% of obstetricians, 63.4% of GPs and 42.9% of midwives had not previously completed the 20 hour WHO Lactation Management Training (Table 4.13).

Seventy percent of the paediatricians, 100% obstetricians and 56.3% GPs felt that the breastfeeding training that they received during the formal qualification for their current career path was not adequate and did not equip them to support and educate breastfeeding mothers, compared to the majority of midwives (57.1%) that felt that the breastfeeding training that they received was adequate, indicating a significant difference between HCWs (p=0.0481) (Table 4.13).

Table 4.12: Attitudes pertaining to breastfeeding

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
What is your opinion about uninterrupted skin-to-skin contact immediately after birth? (choose only one option)	There is no time for it	0	0.0	0	0.0	3	4.2	2	7.1	0.1396	5	4.3
	Is not important for breastfeeding performance	0	0.0	0	0.0	0	0.0	3	10.7		3	2.6
	Helps the flow of colostrum after birth	10	100	8	100	68	95.8	23	82.1		109	93.1
What is your attitude toward the separation of a newborn from the mother at birth? (choose only one option)	It is a normal hospital procedure with no harmful effects	0	0.0	0	0.0	2	2.8	2	7.1	0.0674	4	3.4
	It should only be done in unique situations such as premature births	8	80.0	7	87.5	37	52.1	21	75.0		73	62.4
	It can cause harmful stress to the baby	2	20.0	1	12.5	32	45.1	5	17.9		40	34.2
	It should be done for all caesarean births	0	0.0	0	0.0	0	0.0	0	0.0		0	0.0
How confident are you that you can successfully show a new mother how to correctly position and attach the baby to the breast for breastfeeding?	Not at all confident	0	0.0	0	0.0	5	7.0	0	0.0	0.0004*	5	4.3
	Low confidence	0	0.0	0	0.0	14	19.3	0	0.0		14	12.0
	Moderately confident	6	60.0	7	87.5	34	47.9	7	25.0		54	46.2
	Highly confident	4	40.0	1	12.5	18	25.3	21	75.0		44	37.5
How confident do you feel to give mothers breastfeeding advice?	Not at all confident	0	0.0	0	0.0	3	4.2	0	0.0	0.0050*	3	2.6
	Low confidence	0	0.0	0	0.0	9	12.7	0	0.0		9	7.7
	Moderately confident	6	60.0	7	87.5	31	43.7	6	21.4		50	42.7
	Highly confident	4	40.0	1	12.5	28	39.4	22	78.6		55	47.0
How confident do you feel to give mothers advice on how to treat breastfeeding complications e.g. mastitis, bleeding nipples, breast abscess, engorgement, nipple bleb and blocked duct.	Not at all confident	0	0.0	0	0.0	2	2.8	0	0.0	0.3430	2	1.7
	Low confidence	0	0.0	0	0.0	12	16.9	3	10.7		15	12.8
	Moderately confident	6	60.0	7	87.5	28	39.4	11	39.3		52	44.4
	Highly confident	4	40.0	1	12.5	29	40.8	14	50.0		48	41.0

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
What is your attitude toward the use of pacifiers and/or bottles for the breastfed infant?	There is no harm in the use of pacifiers and/or bottles	5	50.0	3	37.5	10	14.1	4	14.3	0.0007*	22	18.8
	I do not recommend the use of pacifiers and/or bottles	3	30.0	2	25.0	51	71.8	24	85.7		80	68.4
	Other – please comment	2	20.0	3	37.5	10	14.1	0	0.0		15	12.8
What is your attitude toward a frenectomy before the age of 6 months?	It should be done if either the infant or mother is experiencing breastfeeding difficulties	1	10.0	0	0.0	21	29.6	7	25.9	<0001*	29	25.0
	It should be done only if both the mother and baby are experiencing breastfeeding difficulties	0	0.0	0	0.0	15	21.1	1	3.7		16	13.8
	It should be done when the infant is older	3	30.0	0	0.0	9	12.7	5	18.5		17	14.7
	It should not be done at all	5	50.0	6	75.0	4	5.6	1	3.7		16	13.8
	Don’t know	1	10.0	2	25.0	22	31.0	13	48.1		38	32.7
What is your attitude toward breastfeeding in public?	Breastfeeding is natural and mothers should feel comfortable to breastfeed in public	0	0.0	0	0.0	4	5.6	0	0.0	0.0014*	4	3.4
	Mothers should feel comfortable to breastfeed in public but should cover herself and her baby while breastfeeding	4	40.0	0	0.0	31	43.7	22	78.6		57	48.7
	Public breastfeeding is inappropriate	6	60.0	8	100	35	49.3	6	21.4		55	47.0
	Other	0	0.0	0	0.0	1	1.4	0	0.0		1	0.9

Table 4.13: Breastfeeding training

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
When did you receive the 20 hour WHO Lactation Management Training?	During the last 6 months	0	0.0	0	0.0	1	1.4	0	0.0	0.0820	1	0.9
	During the last year	0	0.0	0	0.0	8	11.3	1	3.6		9	7.7
	Two – four years ago	2	20.0	0	0.0	10	14.1	7	25.0		19	16.1
	Five – ten years ago	2	20.0	0	0.0	4	5.6	1	3.6		7	6.0
	More than 10 years ago	1	10.0	1	12.5	3	4.2	7	25.0		12	10.3
	Never	5	50.0	7	87.5	45	63.4	12	42.9		69	56.0
Do you feel that the breastfeeding training you received during your education for your current career path was adequate and equipped you to support and educate breastfeeding mothers?	Yes	3	30.0	0	0.0	26	36.6	16	57.1	0.0481*	45	38.5
	No	7	70.0	8	100	40	56.3	10	35.7		65	55.5
	Don’t know	0	0.0	0	0.0	5	7.0	2	7.1		7	6.0

4.6 Scenario (Attitudes and Practices of healthcare workers)

In order to further assess attitudes and practices of HCWs, the following scenario was provided:

SCENARIO

Chloe is a 20 year old 38 week gestation primipara. Antenatally well, attended antenatal classes, plans to breastfeed. Uneventful 10 hour labour, given pethidine 100 mg IMI 3 hours prior to birth. Spontaneous Vertex Delivery (SVD) of a live healthy female infant Apgar 8/9, weight 3320 grams requiring no medical intervention. Intact perineum. Chloe's mother is keen to find out how much the baby weighs. Parents consented to routine newborn vitamin K and hepatitis B injections for baby.

When asked how they would view the likelihood of Chloe's baby attaching correctly to the breast without assistance within the first hour of birth, 70% of paediatricians and 56.3% of GPs reported the likelihood of Chloe's baby attaching correctly to the breast without assistance within the first hour after birth as "sometimes", while all obstetricians reported "seldom" and 46.4% of the midwives reported "always" (difference in percentage of responses of different HCWs p=<0001). If no medical intervention was needed for the baby, three quarters of obstetricians (75%) would dry wrap the baby before giving the baby to the parents, compared to 100% of paediatricians, 84.5% of GPs and 82.1% of midwives who would place the baby skin-to-skin on Chloe's chest, dry the baby and cover the baby with a warm towel. To assist Chloe with the first breastfeed, only 21.4% midwives would "put the baby on" the breast for her. The majority of HCWs (81.2%), 100% of paediatricians, 75% of obstetricians, 81.7% of GPs and 75% of midwives would teach Chloe how to position and attach the baby for optimal breastfeeding and encourage Chloe to take time to allow the baby to self-attach with minimal assistance and explain a newborn's natural ability to breastfeed (Table 4.14).

Table 4.14: Scenario

Question	Answers	Paediatricians (N=10)		Obstetricians (N=8)		General Practitioners (N=71)		Midwives (N=28)		p-value	Total (N=117)	
		n	%	n	%	n	%	n	%		n	%
How would you view the likelihood of Chloe's baby attaching correctly to the breast without assistance within the first hour of birth?	Never	0	0.0	0	0.0	6	8.4	5	17.9	<0001*	11	9.4
	Seldom	1	10.0	8	100	15	21.1	5	17.9		29	24.8
	Sometimes	7	70.0	0	0.0	14	56.3	5	17.9		52	44.4
	Always	2	20.0	0	0.0	10	14.1	13	46.4		25	21.4
Provided no medical intervention was needed for Chloe or her baby, in this situation, I would:	Dry and wrap the baby before giving to the parents	0	0.0	6	75.0	5	7.0	2	7.1	0.0018*	13	11.1
	Place baby skin-to-skin on Chloe's chest, dry the baby and cover with a warm towel	10	100	2	25.0	60	84.5	23	82.1		95	81.2
	Place the baby under a radiant heater for assessment, weighing and measuring before the first breastfeed attempt	0	0.0	0	0.0	3	4.2	2	7.1		5	4.3
	Encourage Chloe and the family to watch for signs of the baby's readiness to feed	0	0.0	0	0.0	0	0.0	1	3.6		1	0.9
	Other	0	0.0	0	0.0	3	4.2	0	0.0		3	2.6
To assist Chloe with the first breastfeed I would:	"Put the baby on" the breast for her	0	0.0	0	0.0	8	11.3	6	21.4	0.1882	14	12.0
	Teach Chloe how to position and attach baby for optimal breastfeeding and encourage Chloe to take time to allow the baby to self-attach with minimal assistance and explain a newborn's natural ability to breastfeed	10	100	6	75.0	58	81.7	21	75.0		95	81.2
	Wait until Chloe is showered and able to sit up comfortably before offering assistance	0	0.0	2	25.0	4	5.6	0	0.0		6	5.1
	Other	0	0.0	0	0.0	1	1.4	1	3.6		2	1.7

CHAPTER 5

DISCUSSION

5.1 Introduction

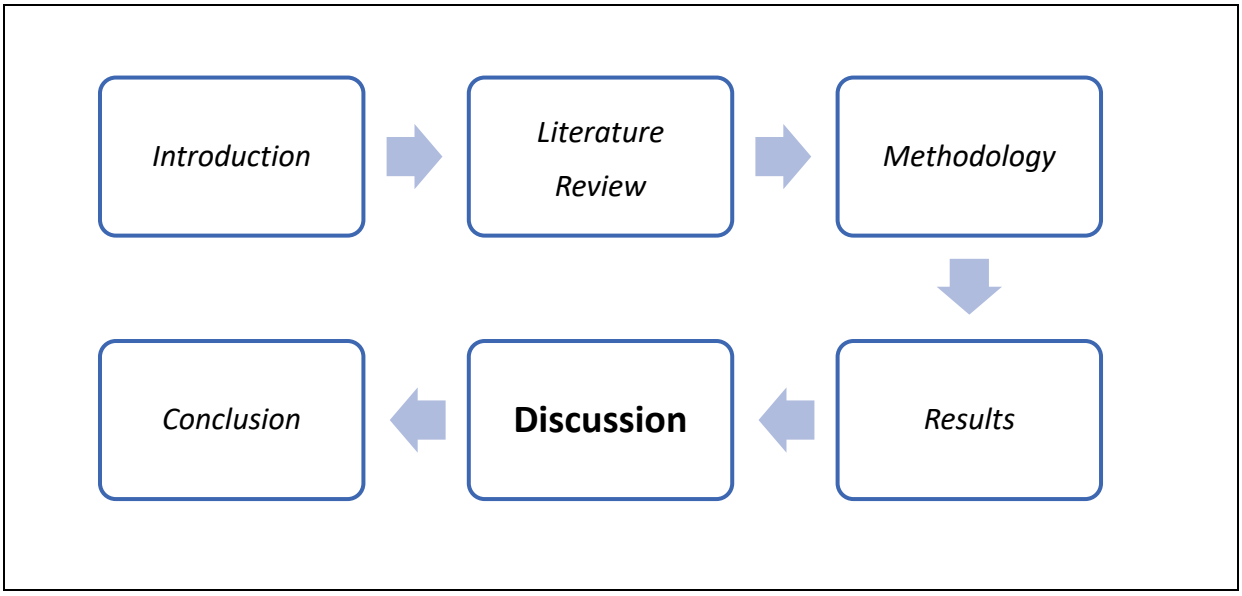

Figure 5.1: Progression of the study: Discussion

As previously mentioned, the aim of the current study was to assess the knowledge, attitudes and practices of healthcare workers related to breastfeeding in the Motheo district, Free State, and to compare the results with the 2016 WHO Infant and Young Child Feeding guidelines and the 2018 Mother-Baby Friendly Initiatives' 10 Steps to Successful Breastfeeding. Figure 5 depicts the progression of the study in terms of the discussion.

Few similar studies have been undertaken amongst healthcare workers. A search of the literature yielded seven studies that were suitable to compare with the findings of the current study. These included the following:

- A descriptive study on the knowledge, attitudes and practices of paediatricians and obstetricians in Johannesburg (Videlefsky *et al*., 1996). This study aimed to assess the current knowledge, attitudes and practices of paediatricians and obstetricians in the greater Johannesburg area, using the WHO/UNICEF 10 Steps to Successful Breastfeeding as a guideline.

- A cross-sectional study on the assessment of quality of newborn care immediately after birth in health facilities across sub-Saharan African countries (de Graft-Johnson *et al.*, 2017). This study aimed to present information on the quality of newborn care services and heath facility readiness to provide newborn care in six African countries and to advocate for the improvement of providers' essential newborn care knowledge and skills.
- A descriptive study on the training interventions about child feeding among primary healthcare (PHC) workers (Samuel *et al.,* 2016). This study aimed to evaluate the effect of training on the knowledge, attitude and provision of infant and young child feeding (IYCF) information and counselling among PHC workers in Ibadan, Nigeria.
- A descriptive study on the role of the paediatrician in breastfeeding management (Handa & Schanler, 2013). This study aimed to evaluate the role of the paediatrician in breastfeeding management in the United States.
- A longitudinal study on the association between maternal perception of obstetric and paediatric care providers' attitudes and exclusive breastfeeding outcomes (Ramakrishnan *et al*., 2014). This study aimed to determine the association between maternal perception of the attitudes of obstetric and paediatric care providers about infant feeding during the neonatal period and exclusive breastfeeding at one, three and six months in the United States.
- A descriptive study on the attitudes and practices of family paediatricians in Italy regarding infant feeding (Radaelli *et al*., 2012). The aim of this study was to examine attitudes and practices of family paediatricians in Italy towards infant feeding in Italy.
- A descriptive study on the practice, attitudes, training and knowledge of obstetricians/gynaecologists (Simard-Émond *et al*., 2011) in Quebec, Canada. The aim of the study was to examine various aspects of obstetricians/gynaecologists' disposition towards breastfeeding counselling.

5.2 Limitations of the study

While this study aimed to assess the knowledge, attitudes and practices of healthcare workers, the following limitations are acknowledged:

- Small sample size, especially of paediatricians and obstetricians.

- The fact that knowledge, attitudes and practices could not be scored – the results only report the percentage of the total group and the various groups of HCWs that responded to the given options as well as associations between the percentage of various HCWs with similar responses.

5.3 Demography of participants

Of the total number of HCWs that participated in the current study, most were GPs (71), followed by midwives (28) and fewer paediatricians (10) and obstetricians (8). While most GPs (64.8%) and midwives (92.9%) were female, most paediatricians (70%) and obstetricians (75%) were male. The median years practicing in the current profession was 7.0 years, with the majority of paediatricians (60%) and half of the obstetricians' employed in private practice, compared to the majority of GPs (85.9%) and midwives (82.1%) who worked in public hospitals.

Throughout the discussion, reference will consistently be made to the total group of HCWs and where responses in the percentage of HCWs differed significantly, these will be highlighted.

5.4 Knowledge of healthcare workers

Numerous organizations, including the WHO and UNICEF, recommend EBF (no other foods or liquids, including water) for the first 6 months of life (Archer *et al*., 2017; DoH, 2011) and breastfeeding on demand – as often as the baby wants to feed, day and night, without limiting the time of feeds. In the present study, a higher percentage of paediatricians (90%), obstetricians (100%) and midwives (92.2%) knew that exclusively breastfed babies do not need additional water compared to only 70.4% of GPs. Although the majority of the HCWs (70%) do not believe in time limited feeds, a significantly higher percentage of obstetricians (100%) and midwives (82.1%) believed this, compared to 40% of paediatricians and 66.2% GPs. More than half of the total group of HCWs (59%) were able to define exclusive breastfeeding. In an earlier study undertaken in SA, Videlefsky *et al*. (1996) reported that almost forty percent (39%) of obstetricians and 48% of paediatricians believed in time limited feeds. Furthermore, about a third (35%) of obstetricians and 15% of paediatricians recommended additional water or dextrose feeds, while 37% of obstetricians believed it is necessary

for breastfed infants to be supplemented with formula milk during the first few days after birth. This view was shared by only 4% of paediatricians (Videlefsky *et al*., 1996).

Numerous studies have confirmed the benefits of breastfeeding, with EBF being even more beneficial than partial breastfeeding (Ramakrishnan et al., 2014). Thus, breastfeeding should not be regarded as merely a lifestyle choice, but rather a key health issue and therefore should receive adequate support, promotion, protection and endorsement by HCWs (Handa & Schanler, 2013; Mclnerny, 2014). Despite this, only about half of HCWs (53%) that participated in the present study were able to list three benefits of breastfeeding for the baby, with 60.6% of GPs being able to do so and only 30% of paediatricians, 25% of obstetricians, and 50% of midwives knowing these benefits (p=0.0180). In addition to being beneficial to the baby, breastfeeding also has important benefits for the mother (Stuebe, 2014; Heymann & Earle, 2013; Mclnerny, 2014; Cockerham-Colas *et al*., 2012; Nesbitt *et al.,* 2012). In the current study, only a quarter of HCWs (26.7%) could correctly list three benefits for the mother, with more GPs (33.8%) than paediatricians (20.0%), obstetricians (25.0%) and midwives (only 10%) being able to do so (p=0.0016). In the study conducted by Samuel *et al.* (2016) in Nigeria*,* it was reported that only 4.8% of HCWs could list three advantages of breastfeeding for the baby and only 29.8% mentioned 3 advantages of breastfeeding for the mother (Samuel *et al.,* 2016). One would have expected more than 50% of midwives to be aware of the benefits of breastfeeding for the baby and more than 10% of midwives to be aware of the benefits for the mother, but this was not the case.

The WHO and UNICEF launched the Baby-Friendly Initiative (BFHI) to protect, promote and support breastfeeding, focussing on “Ten Steps to Successful Breastfeeding”. The South African government renamed it the Mother-Baby Friendly Initiative (MBFI) to include the HIV and code of marketing of breast milk substitute components (Mgolozeli *et al*., 2019). In 2011, the South African Department of Health declared that they would actively promote, protect and support exclusive breastfeeding as a public health intervention to optimise child survival (DoH, 2011). Despite the SA DoH adopting the MBFI, the knowledge of the HCWs in the present study pertaining to the MBFI was generally inadequate. Less than fifteen percent of HCWs (14.5%) were able to name at least one step of the MBFI 10 Steps to Successful Breastfeeding. More than half of HCWs (55.6%) did not know what is acceptable within the scope of the International Code of the Marketing of Breast Milk Substitutes. These findings are

similar to those reported in the previously mentioned study by de Graft-Johnson *et al.* (2017) in 6 Sub-Saharan African countries that found that only 50% of HCWs were able to report at least one step. Gaps in knowledge were observed in all countries. The older study undertaken by Videlefsky et al (1996) in Johannesburg, reported that HCWs did not follow the WHO/UNICEF guidelines and that the HCWs were not “baby friendly” (Videlefsky *et al*., 1996).

Breast milk contains all the necessary nutrients in the exact quantity that an infant needs during the first 6 months of life (Alamirew *et al*., 2017; Archer *et al*., 2017). In the present study, the knowledge of the HCWs pertaining to the nutritional value of breast milk was found to be generally satisfactory. When asked about the nutritional value of colostrum, almost sixty percent (59%) of HCWs agreed that colostrum alone can satisfy the nutritional needs of a healthy full-term baby, with a significantly higher percentage of paediatricians (100%) and obstetricians (100%) compared to only 45.1% of GPs and 67.9% midwives (p=0.0105) answering correctly. Furthermore, almost ninety percent of HCWs (89.7%) knew that formula milk does not contain the same nutrients as breast milk and is not safe for all babies. However, an alarmingly low percentage of HCWs (21.4%) that participated in the present study knew that breast milk alone is nutritionally adequate for all full-term healthy infants 0-6 months. Only 14.3% of midwives agreed, followed by 22.5% of GPs, 25% of obstetricians and 30% of paediatricians (p=0.0038). Mass (2015) reported that 55% of HCWs in the US believed that formula milk is an acceptable feeding option and will not harm the infant. A survey done in 1995 in the US was repeated in 2005 and found the same results, namely that 45% of paediatricians believed that breastfeeding and formula feeding were equally acceptable infant feeding methods (Handa & Schanler, 2013). Another study conducted by Spear (2004) in the US on the knowledge of nurses about breastfeeding, reported poor knowledge of the nutritional value of breast milk among nurses. A large percentage (41.9%) believed that breast milk and formula milk had the same nutritional value (Bernaix *et al*., 2010).

The WHO recommend HIV infected mothers from a lower socio-economic background and who do not meet the AFASS criteria to exclusively breastfeed her infant for the first 6 months of life and continue to breastfeed together with adequate complementary feeding up to 24 months and beyond (WHO, 2018). Despite this recommendation, only six percent of the HCWs that participated in the present study knew this. The

majority of paediatricians (60%) and obstetricians (62.5%) believed that breastfeeding should never be recommended for a HIV infected mother. The AFASS criteria were implemented by the WHO to assist HCWs to determine whether replacement feeding is a safe feeding option for an HIV infected mother and her infant. Despite the importance of the AFASS criteria, almost thirty percent (28.6%) of the midwives did not know what the AFASS criteria represent. HCWs' knowledge related to HIV and breastfeeding was outdated, as less than fifty percent (46.1%) of the HCWs, with a higher percentage of GPs (49.3%) and midwives (50%), compared to the paediatricians (20%) and obstetricians (37.5%), being in line with the newest 2017 WHO guideline pertaining to HIV and continued breastfeeding up to two years and beyond while being fully supported for ART adherence (p=0.0390). These results concur with those of Robb *et al*. (2018) who assessed HCWs breastfeeding knowledge in a high HIV prevalence area in SA. These authors also identified outdated knowledge that was not in line with the WHO current recommendations at that time. Samuel *et al.* (2016) also reported that only 12.9% HCWs stated that mothers infected with HIV should breastfeed and 55.6% believed that the infant should receive complementary foods whenever the infant is ready.

5.5 Attitudes of healthcare workers

A HCW's attitude toward breastfeeding determines whether the HCW will acquire knowledge with regard to breastfeeding? and provide support concerning breastfeeding (Whelan & Kearney, 2015). Different attitudes among HCWs about breastfeeding, and more negative attitudes among physicians and professors compared to nurses, has been shown to contribute to low global breastfeeding rates (de Almeida *et al*., 2015; Videlefsky *et al*., 1996). In the present study, 75% of the midwives felt highly confident to successfully show a new mother how to correctly position and attach the baby to the breast for breastfeeding, compared to only 40% paediatricians, 12.5% obstetricians and 25.3% GPs (p=0.0004). Furthermore, less than half of HCWs (47%) felt highly confident to give mothers breastfeeding advice. A higher percentage of midwives felt highly confident (78.6%) compared to paediatricians (40%), obstetricians (12.5%) and GPs (39.4%) (p=0.0050). When asked about the management of breastfeeding complications, only 41% of HCWs felt highly confident to give mothers advice on how to treat breastfeeding complications

e.g. mastitis, bleeding nipples, breast abscess, engorgement, nipple bleb and blocked duct. Similarly, a lack of knowledge was reported among paediatricians, family physicians, obstetricians, and residents in their field in the management of mastitis, poor milk supply and poor weight gain in infants in the 1990's (de Graft-Johnson *et al*., 2017). According to the survey amongst 2000 paediatrician in 6 countries in Africa, 75% of the male and 64% of the female paediatricians lacked confidence to manage breastfeeding problems (de Graft-Johnson *et al*., 2017). A study undertaken among obstetricians in Canada reported that only 56% felt confident in their ability to support breastfeeding mothers (Simard-Émond *et al*., 2011). Ramakrishnan *et al*. (2014) revealed that in general, HCWs reported that they lacked confidence, knowledge and experience to provide breastfeeding support and felt unsure about whether their advice would be beneficial (Ramakrishnan *et al*., 2014).

Various studies show that different HCW groups (paediatricians, obstetricians, GPs and midwives/nurses) lack adequate breastfeeding education, skills, experience and confidence to support breastfeeding parents, despite their important influence (Cunningham *et al*., 2018; Deloian *et al*., 2015; Handa & Schanler, 2013; Davis *et al*., 2012). Similar results were found in the present study where more than half of HCWs (55.5%) believed that the breastfeeding training that they received during their qualification was not adequate and did not equip them to support and educate breastfeeding mothers. This was true for the majority of paediatricians (70%), obstetricians (100%), and GPs (56.3%), but only 35.7% of midwives (p=0.0481). Furthermore, more than half of HCWs (56%) reported that they had not completed the 20 hour WHO Lactation Management Training. Simard-Émond *et al*. (2011) reported that only 16% believed that they received adequate training on breastfeeding support (Simard-Émond *et al*., 2011).

5.6 Practices of healthcare workers

Inconsistent, conflicting and inadequate breastfeeding advice from HCWs are some of the practices reported by mothers in various studies undertaken in various countries (Creedy *et al*., 2008; Cunningham *et al*., 2018). Inconsistent and conflicting advice was also identified in the current study. As an example, a significantly higher percentage of GPs (76.1%) and midwives (78.6%) than paediatricians (10%) and obstetricians (25%) recommend EBF up to the age 6 months. Ninety percent of the

paediatricians and 75% obstetricians recommend EBF up to the age 4 – 6 months (p<00001). This is similar to the earlier findings of Videlefsky *et al*. (1996), where more than half (66%) of obstetricians and 88% of paediatricians recommended EBF for 4 months (Videlefsky *et al*., 1996). Similarly, a survey in Italy among family paediatricians found that paediatricians' practices do not comply with the current WHO recommendations, with 95% of paediatricians suggesting introducing complementary foods at 4-6 months of age (Radaelli *et al*., 2012).

The WHO recommend continued breastfeeding along with complementary foods until 24 months of age or longer (Alamirew *et al*., 2017; Archer *et al*., 2017; Heymann & Earle, 2013; Mclnerny, 2014; Ramakrishnan *et al*., 2014; Cockerham-Colas *et al*., 2012; Nesbitt *et al.,* 2012; Perrine *et al*., 2012; DoH, 2011). Despite this, less than 30% of HCWs (28.3%) that participated in the present study recommended continued breastfeeding together with complementary feeding up to 24 months and beyond. Videlefsky *et al*. (1996) reported that 71% of obstetricians and 84% of paediatricians recommended breastfeeding for at least 9 months (Videlefsky *et al*., 1996).

The first hour after birth, sometimes called the "golden hour, is a sensitive time. Disrupting or delaying skin-to-skin care may suppress a newborn's innate protective behaviours and make self-attachment and breastfeeding more difficult (Crenshaw, 2014). The WHO and UNICEF recommend initiation of breastfeeding within 1 hour after birth which increases the likelihood of exclusive breastfeeding for one to four months of life as well as the overall breastfeeding duration (Archer *et al*., 2017; DoH, 2011). Despite this recommendation, only 50% obstetricians and 60% paediatricians that participated in the present study encouraged mothers to initiate breastfeeding within one hour after birth, compared to the majority of GPs (64.8%) and midwives (71.4%) who did so within half an hour after birth. Furthermore, the majority of the HCWs (93.1%) correctly believed that uninterrupted skin-to-skin contact immediately after birth helps with the flow of colostrum, whereas less than half of the HCWs (34.2%) believed the separation of a newborn from the mother at birth can cause harmful stress to the baby. Additionally, a significantly higher percentage of GPs (80.3%) and midwives (78.6%) than paediatricians (40%) and obstetricians (37.5%) recommend rooming in for 24 hours a day. De Graft-Johnson *et al.* (2017) reported only 45% of the paediatricians in their study placed newborn infants skin-to-skin immediately after birth in Ethiopia, Kenya, Madagascar, Mozambique, Rwanda and Tanzania (de Graft-

Johnson *et al*. 2017). In the same study, early initiation of breastfeeding and skin-to-skin contact was observed in less than three quarters of births (de Graft-Johnson *et al*., 2017). The older South African study found that 44% of the obstetricians and 50% of the paediatricians advised mothers who had a vaginal delivery to initiate breastfeeding within half an hour after birth, whereas 60% of obstetricians and 55% of paediatricians advised mothers who had a caesarean section to initiate breastfeeding 4 hours after birth (Videlefsky *et al*., 1996).

The WHO and UNICEF recommend EBF (no other foods or liquids, including water) for the first 6 months of life (WHO, 2018). Despite this, a significantly high percentage of paediatricians (60%) and obstetricians (50%) that participated in the present study recommended formula milk with a cup as feeding method if a mother and baby are separated after birth due to an inadvertent situation and the mother is still able to express enough breast milk. In contrast, 80.3% of GPs and 89.3% of midwives recommended breastmilk with a cup as feeding method. Furthermore, the majority of paediatricians (70%) and obstetricians (87.5%) recommended oral glucose administration when a baby is hypoglycaemic, while the majority of GPs (57.7%) and midwives (71.4%) recommended expressed colostrum with a syringe. An alarmingly high percentage of paediatricians (60%) recommended supplementing with formula milk if a baby did not regain birth weight before 2 weeks of age and the medical examination results are normal. Only a quarter of the HCWs (15.4%) recommended a lactation specialist. These findings are in agreement with those of Videlefsky *et al*. (1996) who reported that a very high percentage of obstetricians (78%) and 63% of paediatricians, would recommend formula milk supplementation at two weeks of age if the infant had not regained birth weight (Videlefsky *et al*., 1996).

The WHO and UNICEF recommend that no pacifiers, bottles or teats should be used in breastfed infants (WHO, 2018). Despite this, only thirty percent of paediatricians and 25% obstetricians advised against the use of bottles and pacifiers, in contrast to 71.8% of GPs and 85.7% of midwives who did. Similarly, Videlefsky *et al*. (1996) reported that only 29% of obstetricians and 20% of paediatricians would advise mothers against the use of pacifiers or bottles (Videlefsky *et al*., 1996).

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.2 Introduction

The main aim of this study was to assess the knowledge, attitudes and practices of healthcare workers related to breastfeeding in the Motheo district, Free State, and to compare the results with the 2016 WHO Infant and Young Child Feeding guidelines and the 2018 Mother-Baby Friendly Initiatives' 10 Steps to Successful Breastfeeding.

In the final chapter, conclusions are drawn from the findings of the present study. Recommendations related to addressing the identified challenges associated with the knowledge, attitudes and practices of HCWs related to breastfeeding are made and recommendations for future research are suggested (Figure 6.1).

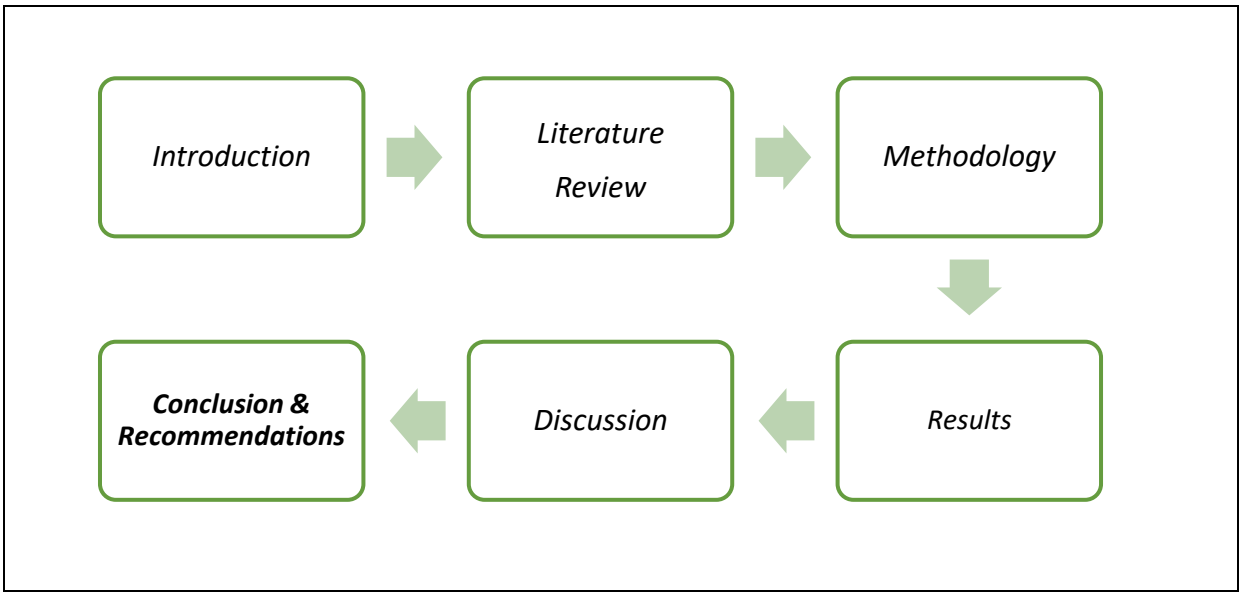

Figure 6.1: Progression of the study: Conclusion and Recommendations

6.3 Conclusions

The following conclusions evolved from the study:

6.3.1 Knowledge

The general breastfeeding knowledge of the HCWs were adequate in terms of some aspects, but in-depth knowledge pertaining to certain aspects of breastfeeding was lacking. The HCWs knowledge about the nutritional value of breast milk was adequate and that of the obstetricians and paediatricians was better than that of the GPs and midwives. The HCWs' knowledge of the benefits of breastfeeding for the baby was better than their knowledge of the benefits for the mother. As a group, the GPs had better knowledge of the benefits of breastfeeding compared to the paediatricians, obstetricians and midwives. This study revealed that more than half of the HCWs never received the 20 hour WHO Lactation Management Training. As a result, poor knowledge of the MBFI 10 Steps to Successful Breastfeeding and the scope of the international code of the marketing of breast milk substitutes was evident. This study showed inadequate and outdated knowledge pertaining to HIV and breastfeeding, of which the knowledge of the paediatricians and obstetricians was more outdated than that of the GPs and midwives. This could be attributed to the fact that the group of paediatricians and obstetricians that participated in the present study were older than the midwives and GPs and due to the fact that they had not recently received training on breast feeding, were still following the often outdated guidelines that they had been taught years ago.

6.3.2 Attitudes

The results of this study revealed a lack in breastfeeding training of HCWs and confidence to support breastfeeding mothers. The GPs, paediatricians and obstetricians were less confident to provide breastfeeding support and to give breastfeeding advice, compared to the midwives. This could be attributed to the fact that the majority of GPs, paediatricians and obstetricians felt that the breastfeeding training that they received during their education was inadequate, compared to the majority of midwives who felt that their breastfeeding training was adequate. Furthermore, the fact that the midwives are more likely to be in contact with mothers

and babies in the wards on a more permanent basis than the other HCWs who only consult the mother and babies, may have resulted in differences in their confidence to work with them.

6.3.3 Practices

This study revealed that not all the practices of HCWs are in line with the 2016 WHO Infant and Young Child Feeding guidelines and 2018 Mother Baby Friendly Initiatives' 10 Steps to Successful Breastfeeding. Deficient practices that were identified included:

- Not recommending exclusive breastfeeding for the first 6 months of life and continued breastfeeding with adequate complementary foods up to the age of 24 months and beyond,
- Delayed initiation of breastfeeding,
- Separation of mother and infant, and
- Giving pre-lacteal feeds to newborns.

These practices were more prominent among paediatricians and obstetricians than GPs and midwives.

6.4 Recommendations

The results of this study revealed gaps and inconsistencies in the HCWs breastfeeding training and therefore non-compliance with the 2016 WHO Infant and Young Child Feeding guidelines and with the 2018 Mother Baby Friendly Initiatives' 10 Steps to Successful Breastfeeding.

For HCWs to improve the competence and quality of the protection, promotion and support that they provide regarding breastfeeding, the following are recommended:

- Universal application of the 20 hour WHO Lactation Management Training to ensure that all HCWs offer the same advice,
- Regular implementation of the 20 hour WHO Lactation Management Training for HCWs who work with mothers and newborns,
- Improvements in breastfeeding training delivered as part of tertiary qualification programmes, and
- More focus on continuing professional development related to breastfeeding.

The data of this study can furthermore assist HCWs, other researchers, decision makers and policymakers to address the identified challenges in the training that is offered in order to protect breastfeeding and to provide the best possible support to the infants and mothers in their care.

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APPENDIX A

Questionnaire

KNOWLEDGE, ATTITUDES AND PRACTICES OF HEALTHCARE WORKERS RELATED TO BREASTFEEDING IN THE MOTHEO DISTRICT, FREE STATE

You have been asked to participate in a research study. Please note that by completing this questionnaire you are voluntarily agreeing to participate in this research study. Your data will be treated confidentially at all times. If you enter your email address for the lucky draw (at the end of the questionnaire) your responses will still remain confidential. You may withdraw from the study at any time during the completion of the questionnaire. The results of the study may be published.

Please complete the following questionnaire on your own without consulting any other source. Your co-operation is extremely valuable in assisting to create better training for healthcare workers with regards to breastfeeding.

Date: _____

Socio-demography

1. **What is your gender?**
   1. Male
   2. Female

2. **What is your birth date (dd/mm/yy)?**
   _____

3. **What is your professional status?**
   1. Paediatrician
   2. Obstetrician
   3. General Practitioner
   4. Midwife

4. **Where do you currently practise?**
   1. Private practice
   2. Private hospital
   3. Baby clinic
   4. Public hospital
   5. Clinic
   6. Other _____

5. **How long have you been practicing your current profession?**
   _____

6. **Explain your understanding of the term “exclusive breastfeeding”**
   _____
   _____
   _____

Please answer the following questions by encircling the correct answer, for example:

All pregnant women should receive breastfeeding education during the antenatal period

1. **True**
2. **False**

7. **Up to what age do you recommend exclusive breastfeeding?**
   1. 3 months
   2. 4-6 months
   3. 6 months
   4. Other _____

8. **Up to what age do you recommend continued breastfeeding together with complementary feeding?**
   1. 8 months
   2. 12 months
   3. 24 months
   4. 24 months and beyond
   5. Other _____

9. **How often should an exclusively breastfed baby be breastfed?**
   1. Every 2 hours
   2. Every 4 hours
   3. Whenever the baby wants to feed
   4. Other _____

10. **Do exclusively breastfed babies need additional water?**
    1. Never
    2. Seldom
    3. Sometimes
    4. Always

11. **For how long should a baby breastfeed per feed?**
    1. Ten minutes on each breast
    2. Twenty minutes
    3. Twenty minutes on each breast
    4. Twenty – forty minutes
    5. As long as the baby wants to
    6. Other – please comment

    _____

12. **Name at least 3 benefits of breastfeeding for the baby**

    _____
    _____
    _____

13. Name at least 3 benefits of breastfeeding for the mother:

_____

_____

_____

14. Colostrum alone can satisfy the nutritional needs of a healthy full term baby.

1. Strongly disagree
2. Disagree
3. Not sure
4. Agree

15. What signs indicates that the baby is getting colostrum at the first breastfeed immediately after birth? (choose only one)

1. You must hear the baby suckling and swallowing
2. You must hear and see the baby swallowing
3. With a strong suckling reflex the cheeks of the baby will be drawn inward
4. If the baby suckles for at least 30 minutes without a pause

16. Which of the following are contra-indications for breastfeeding? (you can choose more than one option)

1. Mastitis
2. Cracked/bleeding nipples (HIV -)
3. Cracked/bleeding nipples (HIV +)
4. Tuberculosis
5. Maternal diabetes
6. Rheumatoid arthritis
7. Epilepsy
8. Use of cytotoxics and antineoplastics
9. Phenylketonuria
10. Cytomegalovirus (CMV)
11. Full-term infant with physiological jaundice
12. Infants of a diabetic mother
13. Not regained birth weight by 10 days
14. Premature infants requiring ICU admission
15. Infant with Gastroesophageal Reflux disease (GERD)
16. Secondary lactose intolerance
17. Galactosemia

17. Choose the CORRECT phrase: (choose only one)

1. Breastmilk alone is NOT nutritionally adequate for infants from 0-6 months
2. Breastmilk alone IS nutritionally adequate for ALL infants 0-6 months
3. Breastmilk alone IS nutritionally adequate for all full term healthy infants 0-6 months
4. Breastmilk alone IS nutritionally adequate for all full term healthy infants 0-4 months

18. **In general, infants who are formula/replacement fed have higher risks for infections (diarrhoea, pneumonia etc.)**
    1. True
    2. False

19. **Breast milk promotes sensory and cognitive development, improved school attendance and a higher IQ**
    1. True
    2. False

20. **Formula milk contains the same nutrients as breast milk and is safe for all babies**
    1. True
    2. False

21. **During lactogenesis III (day 8/9 after birth) a mother produces mature breast milk. What is the first milk that a baby receives during a breastfeed?**
    1. Colostrum
    2. Foremilk
    3. Hindmilk
    4. Don't know

22. **When is breastfeeding recommended for a HIV infected mother?**
    1. Never
    2. If the mother is from a lower socio-economic background and does not meet the AFASS criteria
    3. Always, even for mothers from a high socio-economic background who meets the AFASS criteria
    4. Unsure of what is meant by AFASS

23. **Up to what age of the infant can an HIV infected mother breastfeed according to the newest 2017 WHO guidelines (exclusive plus continued breastfeeding)?**
    1. 3 months
    2. 4-6 months
    3. 6 months
    4. 8 months
    5. Up to one year
    6. Up to 2 years and beyond while being fully supported for ART adherence

24. **How long after birth do you encourage mothers to initiate breastfeeding?**
    1. Within half an hour after birth
    2. One hour after birth
    3. Four hours after birth
    4. Four hours or more after birth
    5. Other – please comment

    _____

25. If a mother and baby are separated after birth due to an inadvertent situation and the mother is still able to express enough breast milk, what feeding method would you recommend for the infant?

1. Formula milk with a cup
2. Breast milk with a bottle
3. Breast milk with a cup
4. Formula milk with a bottle

26. What would you recommend when a baby is hypoglycaemic?

1. Oral glucose administration
2. Formula milk with a bottle
3. Formula milk with a cup
4. Expressed colostrum with a syringe
5. IV infusion
6. Other – please comment

_____

27. The following may contribute to stabilization of the blood sugar levels of a newborn: (choose only one option)

1. Wrapping the baby
2. Placing the baby in an incubator
3. Placing the baby in skin-to-skin contact

28. What is your opinion about uninterrupted skin-to-skin contact immediately after birth? (choose only one option)

1. There is no time for it
2. Is not important for breastfeeding performance
3. Helps the flow of colostrum after birth

29. What is your attitude toward the separation of a newborn from the mother at birth? (choose only one option)

1. It is a normal hospital procedure with no harmful effects
2. It should only be done in unique situations such as premature births
3. It can cause harmful stress to the baby
4. It should be done for all caesarean births

30. Choose only one of the following:

1. I recommend rooming in 24 hours a day
2. I recommend rooming in for most part of the day but taking the baby to the baby room at night so that the mother can rest
3. I do not recommend rooming in at all because mothers tend to struggle to cope with their babies in the same room
4. Other – please comment

_____

31. How confident are you that you can successfully show a new mother how to correctly position and attach the baby to the breast for breastfeeding?

1. Not at all confident
2. Low confidence

3. Moderately confident
4. Highly confident

32. How confident do you feel to give mothers breastfeeding advice?
1. Not at all confident
2. Low confidence
3. Moderately confident
4. Highly confident

33. How confident do you feel to give mothers advice on how to treat breastfeeding complications e.g. mastitis, bleeding nipples, breast abscess, engorgement, nipple bleb and blocked duct.
1. Not at all confident
2. Low confidence
3. Moderately confident
4. Highly confident

34. If a baby did not regain birth weight before 2 weeks of age and the medical examination results are normal, what would you recommend?
1. Supplementing with formula milk
2. Stop breastfeeding and give only formula milk
3. Encourage the mother to breastfeed more often
4. Refer the mother to a lactation specialist
5. Other – please comment

_____

35. What would you recommend to a mother experiencing painful nipples? (choose only one option)
1. Use a nipple shield
2. Temporarily discontinue breastfeeding and formula feed
3. Try better positioning and attachment of the baby onto the breast
4. Push through and continue breastfeeding because breastfeeding is painful during the first few days

36. What would you recommend to a mother with low milk production? (choose only one option)
1. Top up with formula milk using a bottle
2. Top up with formula milk using a cup
3. Encourage her to breastfeed more often
4. Encourage her to use galactogogues
5. Evaluate a breastfeed session to determine correct positioning and attachment

37. What is your attitude toward the use of pacifiers and/or bottles for the breastfed infant?
1. There is no harm in the use of pacifiers and/or bottles
2. I do not recommend the use of pacifiers and/or bottles
3. Other – please comment

_____

38. What is your attitude toward a frenectomy before the age of 6 months?

1. It should be done if either the infant or mother is experiencing breastfeeding difficulties
2. It should be done only if both the mother and baby are experiencing breastfeeding difficulties
3. It should be done when the infant is older
4. It should not be done at all
5. Don't know

SCENARIO

Chloe is a 20 year old 38 week gestation primipara. Antenatally well, attended antenatal classes, plans to breastfeed. Uneventful 10 hour labour, given pethidine 100 mg IMI 3 hours prior to birth. Spontaneous Vertex Delivery (SVD) of a live healthy female infant Apgar 8/9, weight 3320 grams requiring no medical intervention. Intact perineum. Chloe's mother is keen to find out how much the baby weighs. Parents consented to routine newborn vitamin K and hepatitis B injections for baby.

39. How would you view the likelihood of Chloe's baby attaching correctly to the breast without assistance within the first hour of birth?

1. Never
2. Seldom
3. Sometimes
4. Always

40. Provided no medical intervention was needed for Chloe or her baby, in this situation, I would:

1. Dry and wrap the baby before giving to the parents
2. Place baby skin-to-skin on Chloe's chest, dry the baby and cover with a warm towel
3. Place the baby under a radiant heater for assessment, weighing and measuring before the first breastfeed attempt
4. Encourage Chloe and the family to watch for signs of the baby's readiness to feed
5. Other – please comment:

   _____
   _____

41. To assist Chloe with the first breastfeed I would:

1. "Put the baby on" the breast for her
2. Teach Chloe how to position and attach baby for optimal breastfeeding and encourage Chloe to take time to allow the baby to self-attach with minimal assistance and explain a newborn's natural ability to breastfeed
3. Wait until Chloe is showered and able to sit up comfortably before offering assistance
4. Other – please comment

   _____

Answer the following questions irrespective of the scenario:

42. Explain your understanding of "induced lactation".

_____
_____

43. What is your attitude toward breastfeeding in public?

1. Breastfeeding is natural and mothers should feel comfortable to breastfeed in public
2. Mothers should feel comfortable to breastfeed in public but should cover herself and her baby while breastfeeding
3. Public breastfeeding is inappropriate
4. Other – please comment:

   _____
   _____

44. Name any 3 of the MBFI '10 Steps to Successful Breastfeeding'

_____
_____
_____

45. According to the International Code of the Marketing of Breast Milk Substitutes it is ACCEPTABLE to: (choose only one option)

1. Receive samples of infant formula or other products within the scope of this code
2. Receive financial and/or material inducements to promote products within the scope of this code
3. Receive scientific information regarding products within the scope of this code
4. None of the above
5. All of the above

46. What support do you suggest to breastfeeding mothers on discharge? (you can choose more than one option)

1. Breastfeeding support group
2. Lactation specialist
3. List of resources for breastfeeding help
4. Gynaecologist
5. Paediatrician
6. General practitioner
7. Midwife
8. None

47. When did you receive the 20 hour WHO Lactation Management Training?

1. During the last 6 months
2. During the last year
3. Two – four years ago
4. Five – ten years ago
5. More than 10 years ago

6. Never

48. Do you feel that the breastfeeding training you received during your education for your current career path was adequate and equipped you to support and educate breastfeeding mothers?

1. Yes
2. No
3. Don’t know

THANK YOU FOR PARTICIPATING

APPENDIX B

Health Sciences Research Ethics Committee approval letter

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
YUNIVESITHI YA FREISTATA

UFS·UV
HEALTH SCIENCES
GESONDHEIDSWETENSKAPPE

Health Sciences Research Ethics Committee

12-Feb-2020

Dear **Miss Imke Hennop**

Ethics Clearance: **Knowledge, attitudes and practices of healthcare workers related to breastfeeding in the Motheo District, Free State**

Principal Investigator: **Miss Imke Hennop**

Department: **Human Nutrition Department (Bloemfontein Campus)**

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is:**UFS-HSD2019/0173/2502**

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act. No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

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