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RESEARCH ARTICLE

Knowledge, attitudes and support practices related to breastfeeding promotion of doctors and nurses in Motheo district, Free State province, South Africa

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Background: Breastfeeding is widely acknowledged as the optimal method of infant feeding. However, the percentage of South African mothers who exclusively breastfeed remains alarmingly low. Healthcare workers (HCWs) are pivotal in promoting breastfeeding; however, a deficiency in their knowledge, negative attitudes, and unfavourable practices can impede the promotion and support of breastfeeding.
Aim: To assess the knowledge, attitudes, and support practices related to breastfeeding promotion of HCWs in the Motheo district, Free State province, compared with the 2016 WHO Guideline updates on HIV and infant feeding and 2018 Mother-Baby Friendly initiative guidelines.
Methods: A quantitative analytical cross-sectional study involving paediatricians, obstetricians, general practitioners (GPs), and midwives was conducted using a self-administered questionnaire.
Results: Over half of the HCWs (59%) were able to define exclusive breastfeeding (EBF), with a significant majority of GPs (76.1%) and midwives (78.6%) recommending EBF up to six months, compared with only 10% of paediatricians and 25% of obstetricians ($p < 0.001$). Some 11.1% of the total group of HCWs reported that breastfeeding is contraindicated for HIV-infected mothers, while 15.4% were unsure of the recommendation for breastfeeding among HIV-infected mothers. A higher proportion of midwives, compared with other HCWs, felt highly confident in providing breastfeeding advice ($p < 0.001$). Additionally, more than half (56%) of HCWs had not completed the 20-hour WHO Lactation Management Training, and 55% believed their prior breastfeeding training was not sufficient to support and educate breastfeeding mothers.
Conclusion: Regular breastfeeding training of HCWs on the latest breastfeeding guidelines is necessary to equip HCWs with the knowledge and competence to successfully promote, protect, and support breastfeeding.

Keywords: breastfeeding, knowledge, practices, attitude, guidelines

Introduction

Breastfeeding is widely known as the optimal approach for providing infants with the best nutrition. Evidence from numerous studies has confirmed the nutritional and immunological benefits of breastfeeding to infants during the first six months of life, with exclusive breastfeeding being even more beneficial than mixed feeding.[1–3] Breastfeeding provides infants with protection against respiratory tract infections, bronchiolitis, gastroenteritis, atopic dermatitis, necrotising enterocolitis, undernutrition, and mortality, including sudden infant death syndrome, while reducing the risk of obesity and chronic diseases in later life.[1,4–10] Furthermore, there is evidence that shows that infants who are breastfed for a longer period of time have lower infection-related morbidity and mortality, fewer dental malocclusions, and higher intelligence than those who were breastfed for a shorter period of time or were not breastfed at all.[11] Additionally, breastfeeding promotes infant brain development, and establishes a close bond between mother and child, which positively influences emotional and cognitive development.[12,13] To the lactating mother, breastfeeding confers protection against breast and ovarian cancer, hypertension, diabetes, osteoporosis, and myocardial infarction.[11,14–18]

Despite the well-established benefits of breastfeeding, the percentage of South African mothers who breastfeed, especially exclusively for the first six months of life, remains alarmingly low. According to the 2016 South Africa Demographic and Health Survey, only 32% of infants aged 0–6 months were exclusively breastfed, while 25% were not breastfed at all.[19] 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 six months were bottle fed. Only 47% of children 12–17 months old and 19% of children 18–23 months old were breastfed.[19] Additionally, a study conducted in four provinces of South Africa to assess breastfeeding practices, observed that 17% of mothers introduced complementary foods before one month of age.[20]

Healthcare workers (HCWs) play a key role in promoting, protecting, and supporting breastfeeding, yet there is some evidence to show that HCWs are not always adequately equipped to do this successfully.[21] The World Health Organization (WHO) and the United Nations Children Fund (UNICEF) regularly update evidence-based recommendations for successful initiation and continuity of exclusive breastfeeding in the first six months of life. For instance, in 2016, the WHO updated its guidelines on HIV and infant feeding, which were formally adopted by the South African Department of Health.[22,23] Despite the availability of these evidence-based guidelines, it is challenging to translate them in a practical

way.[24] Evidence from a systematic review including 56 studies across 17 sub-Saharan African countries including South Africa has confirmed a widespread lack of appropriate breastfeeding knowledge among various HCWs, including general practitioners, paediatricians, obstetricians, midwives, and nurses over the years.[25] According to the review, lack of knowledge and misconceptions among HCWs resulted in inconsistent messages regarding early breastfeeding initiation, breastfeeding support, infant feeding options for HIV-positive mothers, pre-lacteal feeding, breastfeeding after Caesarean delivery, and infant formula feeding.[25] Additionally, poor attitudes and unwillingness on the part of HCWs to provide breastfeeding support, were observed as barriers to successful breastfeeding.[25]

The lack of appropriate breastfeeding knowledge and skills among HCWs could be attributed to a lack of standardised breastfeeding education among healthcare professionals, which is influenced by the curriculum, educator qualification, assessment strategies, and training provided by universities and hospitals.[26,27] The undergraduate training curriculum for most health professions, especially in nursing and medical programmes, devotes little time to building skills for effective breastfeeding support, despite the numerous benefits of successful breastfeeding.[28–30] The gap in both undergraduate and in-service breastfeeding education has been recognised by the WHO and UNICEF in the 2021 'counselling women to improve breastfeeding practices' guideline document, which provides recommendations on how curriculum planners can improve undergraduate and in-service breastfeeding education and skill training for HCWs.[31] Additionally, the WHO and UNICEF recognise the need for in-service breastfeeding training for maternity staff and have made provision for such training in a 20-hour lactation course based on the Baby Friendly Hospital Initiative (BFHI).[32] The South African National Department of Health refers to BFHI as the Mother-Baby Friendly Initiative (MBFI).[22] A study in Croatia reveals that healthcare workers have inadequate knowledge, attitudes, and skills in breastfeeding support, posing challenges in implementing WHO and UNICEF breastfeeding guidelines.[33] In South Africa, professional nurses in Limpopo identified the lack of formal and continuous training for nurses as a challenge to the successful promotion and support of exclusive breastfeeding.[34] Aside from the lack of continuous training on breastfeeding for HCWs, studies have shown that some paediatric feeding refresher workshops are supported by manufacturers of breastmilk substitutes.[35,36]

Another study conducted in Mpumalanga, reported the concerns of mothers regarding miscommunication from some HCWs regarding breastfeeding, which negatively influenced their choice of infant feeding methods.[37] Insufficient knowledge of breastfeeding, negative attitudes, and unfavourable practices of HCWs significantly affect the safeguarding, encouragement, and endorsement of breastfeeding.[25] More importantly, the attitude of HCWs towards breastfeeding, specifically their belief in its merits, plays a pivotal role in their knowledge-seeking attitude and support for breastfeeding.[38,39] Accurate assessment of breastfeeding knowledge, attitudes, and support practices of HCWs can help identify learning shortfalls and motivate the content of breastfeeding training programmes to the benefit of both infants and mothers.[40,41] Due to the low breastfeeding rates in South Africa,[19] an investigation of the competence of HCWs to support and promote successful breastfeeding is imperative. This study aimed to evaluate the knowledge, attitudes, and support practices related to breastfeeding promotion among HCWs whose responsibilities include supporting and promoting breastfeeding in the Motheo district of South Africa.

Methods

Study design, participants, and setting

This study comprised a quantitative analytical cross-sectional study conducted among registered paediatricians, obstetricians, general practitioners, and midwives working in private and public healthcare facilities in the Motheo district, Free State. The district municipality of Motheo was selected for the present study for its proximity to the university that conducted the study. The majority of the population of Motheo (82.4%) consists of Black Africans (52.3% female, and 47.7% male), with Sesotho as the native language of over 53% of residents.[42]

Inclusion criteria

HCWs were eligible to participate in the study if they were: (i) obstetricians, paediatricians, or general practitioners (GPs) registered with the Health Professions Council of South Africa (HPCSA) who attended to infants and children in their line of practice; (ii) South African Nursing Council registered midwives; (iii) actively practicing in the private, academic, or public sector in the Motheo district, Free State; and (iv) provided consent to participate in the study.

Exclusion criteria

Doctors and nurses working in specialties not related to infant feeding were excluded.

Sampling

A total of seven private ($n = 3$) and public healthcare facilities ($n = 4$) with both in- and out-patient services were randomly selected among the 14 health facilities with a maternal and child department in the Motheo district. All nurses and doctors working in the seven selected healthcare facilities who met the inclusion criteria were eligible to participate and were invited. A hard copy of the questionnaire was distributed to doctors and nurses working at the seven health facilities. Questionnaires were completed anonymously 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. In addition, the Medpages database, was used to identify healthcare professionals who met the inclusion criteria. These HCWs were invited to participate via the e-mail address published on the Medpages database. The e-mail explained the study and contained a link to the electronic questionnaire, which was designed using SurveyMonkey.

Ethics approval and consent

Approval for this research was obtained from the Health Sciences Research Ethics Committee of the University of the Free State (UFS-HSD2019/0173/2502), the Free State Department of Health, and the Chief Executive Officers of the included healthcare facilities. All participants received an information document explaining the purpose and procedures of the study. A statement of consent to participate was displayed on the first page of the questionnaire. By agreeing to complete the anonymous questionnaire, the participant provided consent. Participants were under no obligation to participate in the study.

Data collection

Data were collected over a three-month period in 2019. The self-administered questionnaire included information on the

demographics, knowledge, attitudes, and support practices regarding breastfeeding promotion of the HCWs. The questionnaire was developed by the research team based on the 2016 WHO guideline updates on HIV and infant feeding; and the 2018 Mother-Baby Friendly Initiatives' 10 steps to successful breastfeeding.[22,23,43] The questionnaire included both open-ended and closed-ended questions. The questionnaire was administered both electronically and via hard copy.

Demographic information included sex, birth date, profession, place of work, and the period of practicing in a specific specialty. To determine the knowledge of HCWs on breastfeeding, questions about the following were asked: (i) exclusive breastfeeding, (ii) continued breastfeeding and complementary feeding, (iii) management of breastfeeding, (iv) benefits of breastfeeding, (v) contra-indications to breastfeeding, (vi) breastfeeding in the context of HIV, (vii) the phases of lactogenesis, (viii) the 10 steps to successful breastfeeding, and (ix) Infant and Young Child Feeding recommendations. Additionally, the attitudes of HCWs towards breastfeeding were explored by assessing (i) their confidence to support, assist, and give mothers breastfeeding advice and (ii) attitude towards breastfeeding training that had been received. The breastfeeding promotion practices of HCWs were investigated by assessing the actions and recommendations of HCWs in certain situations such as when (i) a baby did not regain birthweight at two weeks post-delivery, (ii) mother is experiencing painful nipples, or (iii) mother is experiencing low milk production.

Content validation of questionnaire

The questionnaire was reviewed by four lactation consultants to improve content. Additionally, a pilot study was undertaken prior to the main survey to determine whether the questions were easy to understand. A sample of two paediatricians, two GPs, 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 changes were required and thus the results of the pilot study could be included in the main study.

Data analysis

Both hardcopy and electronic questionnaires were captured into a Microsoft Excel Spreadsheet (Microsoft Corp, Redmond, WA, USA) by the researcher for cleaning and verification by the biostatistician. Descriptive statistics including frequencies and percentages were used to describe categorical data, while medians and range (minimum–maximum) were used to describe numerical data. Differences in responses between the various HCWs were analysed using Fisher's exact test. All analyses were performed using SAS software (SAS Institute, Cary, NC, USA).

Results

Demography of participants

A total of 117 HCWs participated in the study, among which ten were paediatricians, eight obstetricians, 71 GPs, and 28 midwives. The median age of the participants, was 34.0 years, ranging from 24.4 years to 65.0 years. The median (minimum, maximum) years of practice in current profession was 7.0 (1.0, 31.0) years. The majority of GPs (85.9%, $n = 61$) and midwives (82.1%, $n = 23$) worked in public hospitals, while six of the ten paediatricians (60%) and four of the eight obstetricians (50%) were in private practice. More than half of participants were female (65.8%) (Table 1).

Breastfeeding knowledge of health care workers

General breastfeeding knowledge

The knowledge of HCWs on breastfeeding is summarised in Table 2. The majority, ($n = 82$, 70%) of HCWs were aware that breastfeeding per feed should not be time-restricted. Nevertheless, a significant variation in this awareness was observed among the HCWs, with all (8) obstetricians and 82.1% ($n = 23$) of midwives recognising this, in contrast to 40% ($n = 4$) of paediatricians and 66.2% ($n = 47$) of GPs ($p = 0.002$). Additionally, 24% ($n = 17$) of GPs knew the signs of a baby receiving colostrum at the first breastfeed immediately after birth, compared to none of the paediatricians, obstetricians, and midwives, a difference that was statistically significant ($p < 0.001$). Although all paediatricians and obstetricians were aware that foremilk is the first milk a baby receives when a mother produces mature breastmilk, only 67.6% ($n = 48$) of GPs and 25% ($n = 7$) of midwives had knowledge of this. Additionally, 92% ($n = 108$) of the HCWs knew that placing a baby in skin-to-skin contact contributes to stabilisation of their glucose levels. In contrast, fewer

Table 1: Demographic characteristics of study participants

Variable	Total *N* = 117 Median (min, max)	General Practitioners *n* = 71 Median (min, max)	Midwives *n* = 28 Median (min, max)	Paediatricians *n* = 10 Median (min, max)	Obstetricians *n* = 8 Median (min, max)
Age	34.0 (24.4, 65.0)	30.1 (24.3, 58.8)	36.0 (28.5, 57.4)	45.3 (38.1, 65.0)	46.0 (40.1, 50.0)
Years of practice in current position	7.0 (1.0, 31.0)	5.0 (1.0, 30.0)	8.0 (1.0, 31.0)	10.0 (3.0, 22.0)	15.0 (10.0, 20.0)
	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**
Sex:					
Male	40 (34.2)	25 (35.2)	2 (7.1)	7 (70.0)	6 (75.0)
Female	77 (65.8)	46 (64.8)	26 (92.9)	3 (30.0)	2 (25.0)
Working environment:					
Private practice	10 (8.5)	0 (0.0)	0 (0.0)	6 (60.0)	4 (50.0)
Private hospital	20 (17.1)	10 (14.1)	4 (14.3)	3 (30.0)	3 (37.5)
Public hospital	86 (73.5)	61 (85.9)	23 (82.1)	1 (10.0)	1 (12.5)
Other	1 (0.9)	0 (0.0)	1 (3.6)	0 (0.0)	0 (0.0)

Table 2: Breastfeeding knowledge of health care workers

Questions	Total *N* = 117	GP *n* = 71	Midwives *n* = 28	Paediatricians *n* = 10	Obstetricians *n* = 8	*p*-value
General breastfeeding knowledge						
1. For how long should a baby breastfeed per feed?						
Correct response (As long as the baby wants to)	82 (70.0)	47 (66.2)	23 (82.1)	4 (40.0)	8 (100.0)	0.002
2. What signs indicate that the baby is getting colostrum at the first breastfeed immediately after birth?						
Correct response (You must hear and see the baby swallowing)	17 (14.5)	17 (23.9)	0 (0.0)	0 (0.0)	0 (0.0)	< 0.001
3. During lactogenesis III (day 8/9 after birth) a mother produces mature breastmilk. What is the first milk that a baby receives during a breastfeed?						
Correct response (Foremilk)	73 (62.4)	48 (67.6)	7 (25.0)	10 (100.0)	8 (100.0)	< 0.001
4. What may contribute to stabilisation of the blood sugar levels of a newborn						
Correct response (Placing the baby in skin-to-skin contact)	108 (92.3)	64 (90.1)	26 (92.9)	10 (100.0)	8 (100.0)	0.934
5. Explain your understanding of 'induced lactation'						
Correct understanding of 'induced lactation'	19 (16.2)	13 (18.3)	4 (14.3)	2 (20.0)	0 (0.0)	0.701
Knowledge pertaining to exclusive breastfeeding						
1. Explain your understanding of the term 'exclusive breastfeeding'						
Correct response (the infant receives only breastmilk. 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)	69 (59.0)	44 (61.9)	15 (53.6)	6 (60.0)	4 (50.0)	0.823
2. Up to what age do you recommend exclusive breastfeeding?						
Correct response (6 months)	79 (67.5)	54 (76.1)	22 (78.6)	1 (10.0)	2 (25.0)	< 0.001
3. How often should an exclusively breastfed baby be breastfed?						
Correct response (Whenever the baby wants to feed)	95 (81.2)	54 (76.1)	23 (82.10)	10 (100.0)	8 (100.0)	0.861
4. Do exclusively breastfed babies need additional water?						
Correct response (Never)	93 (79.5)	50 (70.4)	26 (92.9)	9 (90.0)	8 (100.0)	0.049
Knowledge pertaining to the benefits of breastfeeding						
1. Name at least 3 benefits of breastfeeding for the baby						
Not one correct response	14 (12.0)	9 (12.7)	2 (7.1)	0 (0.0)	3 (37.5)	0.018
1 correct response	9 (7.7)	4 (5.6)	5 (17.9)	0 (0.0)	0 (0.0)	
2 correct responses	32 (27.3)	15 (21.1)	7 (25.0)	7 (70.0)	3 (37.5)	
3 correct responses	62 (53.0)	43 (60.6)	14 (50.0)	3 (30.0)	2 (25.0)	
2. Name at least 3 benefits of breastfeeding for the mother						
Not one correct response	12 (10.3)	9 (12.7)	0 (0.0)	0 (0.0)	4 (50.0)	0.002
1 correct response	16 (13.9)	7 (9.9)	9 (32.1)	0 (0.0)	0 (0.0)	
2 correct responses	57 (49.1)	31 (43.7)	16 (57.1)	8 (80.0)	2 (25.0)	
3 correct responses	31 (26.7)	24 (33.8)	3 (10.7)	2 (20.0)	2 (25.0)	
3. Colostrum alone can satisfy the nutritional needs of a healthy full-term baby						
Strongly disagree	16 (13.7)	12 (16.9)	4 (14.3)	0 (0.0)	0 (0.0)	0.011
Disagree	27 (23.1)	24 (33.8)	3 (10.7)	0 (0.0)	0 (0.0)	
Not sure	5 (4.3)	3 (4.2)	2 (7.1)	0 (0.0)	0 (0.0)	
Agree	69 (59.0)	32 (45.1)	19 (67.9)	10 (100.0)	8 (100.0)	
4. Choose the CORRECT phrase						
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 (0.0)	0.004
Breastmilk alone IS nutritionally adequate for ALL infants 0–6 months	86 (73.5)	53 (74.7)	24 (85.7)	3 (30.0)	6 (75.0)	
Breastmilk alone IS nutritionally adequate for all full -term healthy infants 0–6 months	25 (21.4)	16 (22.5)	4 (14.3)	3 (30.0)	2 (25.0)	
	6 (5.1)	2 (2.8)	0 (0.0)	4 (40.0)	0 (0.0)	

(*Continued*)

Table 2: Continued.

Questions	Total *N* = 117	GP *n* = 71	Midwives *n* = 28	Paediatricians *n* = 10	Obstetricians *n* = 8	*p*-value
Breastmilk alone IS nutritionally adequate for all full -term healthy infants 0–4 months						
5. In general, infants who are formula/replacement fed have higher risks for infections						
True	109 (93.2)	63 (88.7)	28 (100.0)	10 (100.0)	8 (100.0)	0.245
False	8 (6.8)	8 (11.3)	0 (0.0)	0 (0.0)	0 (0.0)	
6. Breastmilk promotes sensory and cognitive development, improved school attendance, and higher IQ						
True	108 (92.3)	63 (88.7)	27 (96.4)	10 (100.0)	8 (100.0)	0.536
False	9 (7.7)	8 (11.3)	1 (3.6)	0 (0.0)	0 (0.0)	
7. Formula milk contains the same nutrients as breastmilk and is safe for all babies						
True	12 (10.3)	8 (11.3)	4 (14.3)	0 (0.0)	0 (0.0)	0.670
False	105 (89.7)	63 (88.7)	24 (85.7)	10 (100.0)	8 (100.0)	
Knowledge pertaining to Mother-Baby Friendly Initiative (MBFI)						
1. Name any 3 of the MBFI '10 Steps to Successful Breastfeeding'						
Not one correct	67 (57.3)	42 (59.1)	12 (42.9)	7 (70.0)	6 (75.0)	0.102
1 correct	17 (14.5)	11 (15.5)	6 (21.4)	0 (0.0)	0 (0.0)	
2 correct	15 (12.8)	12 (16.9)	3 (10.7)	0 (0.0)	0 (0.0)	
3 correct	18 (15.4)	6 (8.4)	7 (25.0)	3 (30.0)	2 (25.0)	
2. According to the International Code of the Marketing of Breastmilk Substitutes it is ACCEPTABLE to: (choose only one option)						
Receive samples of infant formula or other products within the scope of this code	4 (3.4)	3 (4.2)	1 (3.6)	0 (0.0)	0 (0.0)	0.588
Receive financial and/or material inducements to promote products within the scope of this code	2 (1.7)	0 (0.0)	2 (7.1)	0 (0.0)	0 (0.0)	
Receive scientific information regarding products within the scope of this code	40 (34.2)	28 (39.4)	6 (21.4)	4 (40.0)	2 (25.0)	
None of the above	65 (55.6)	36 (50.7)	17 (60.7)	6 (60.0)	6 (75.0)	
All of the above	6 (5.1)	4 (5.6)	2 (7.1)	0 (0.0)	0 (0.0)	

than 20% (16.2%, $n = 19$) of all the HCWs knew what induced lactation is.

Knowledge pertaining to exclusive breastfeeding

Only 59% ($n = 69$) of all the HCWs, including 60% ($n = 6$) of paediatricians, 50% ($n = 4$) of obstetricians, 61.9% ($n = 44$) of GPs, and 53.6% ($n = 15$) of midwives, were able to correctly define the term 'exclusive breastfeeding'. When asked to what age they recommend exclusive breastfeeding, most GPs ($n = 54$, 76.1%) and midwives ($n = 22$, 78.6%) indicated that they recommend exclusive breastfeeding up to 6 months, compared to only one of the ten (1%) of paediatricians and two of the eight (12.5%) obstetricians. Majority of paediatricians (nine of the ten, 90%) and obstetricians (six of the eight, 75%) recommended exclusive breastfeeding up to the age of 4–6 months, indicating a significant difference in their knowledge of how long exclusive breastfeeding should be done based on WHO recommendations ($p < 0.001$). All the paediatricians and obstetricians, as well as 76.1% ($n = 54$) of GPs and 82.1% ($n = 23$) of midwives knew that babies should breastfeed on demand. When questioned about the necessity of additional water for exclusively breastfed babies, a greater proportion of paediatricians (nine of ten, 90%), midwives ($n = 26$, 92.9%), and all obstetricians (100%), recognised that exclusively breastfed infants do not require additional water, in contrast to only 70.4% ($n = 50$) of GPs. This difference was statistically significant ($p = 0.049$).

Knowledge pertaining to the benefits of breastfeeding

A significantly greater percentage of GPs ($n = 42$, 60.6%) compared to only three of ten (30%) paediatricians, two of eight (25%) obstetricians, and 50% ($n = 14$) of midwives were able to enumerate three benefits of breastfeeding for the baby ($p = 0.018$). Although the proportion of HCWs capable of listing three maternal benefits of breastfeeding was low (26.7%), a higher percentage of the GPs ($n = 24$, 33.8%) compared to two of ten paediatricians (20%), two of eight obstetricians (25%), and 10.7% ($n = 3$) of midwives were able to list three benefits of breastfeeding for the mother ($p = 0.002$). More than half of HCWs (59%) agreed that colostrum alone can satisfy the nutritional needs of a healthy full-term baby, with 100% of paediatricians and obstetricians, and 67.9% of midwives, in contrast to only 45.1% of GPs agreeing to this fact ($p = 0.011$). Only 21.4% of all the HCWs were cognisant that breastmilk alone is nutritionally adequate for all full-term healthy infants 0–6 months old. Among the different professionals, only three of ten (30%) paediatricians, two of eight (25%) obstetricians, and 22.5% ($n = 16$) of the GPs, knew this, and significantly fewer midwives ($n = 4$, 14.3%) did ($p = 0.004$).

The vast majority of HCWs (93.2%), (all paediatricians and obstetricians, 88.7% of GPs, and 93.2% of midwives) were aware that infants who are formula-fed have an increased risk of infections such as diarrhoea and pneumonia. Similarly, most of the HCWs (92.3%), including all paediatricians and obstetricians, 88.7% of

GPs, and 96.4% of midwives, recognised that breastfeeding promotes sensory and cognitive development, improves school attendance, and correlates with a higher IQ. Additionally, 89.7% of the HCWs, comprising all paediatricians and obstetricians, understood that formula milk does not contain the same essential nutrients as breastmilk and is not universally safe for all infants, in contrast to 88.7% of GPs and 85.7% of midwives.

Knowledge pertaining to Mother-Baby Friendly Initiative (MBFI)

Only 42.7% of HCWs were able to name at least one step of the MBFI 10 Steps to Successful breastfeeding. Concerningly, 44.4% of the total group of HCWs had no knowledge of what is acceptable within the scope of the International Code of the Marketing of Breastmilk Substitutes.

Knowledge pertaining to the contra-indications for breastfeeding

Concerning the knowledge of contraindications for breastfeeding, 53% of the HCWs, including nine of the ten paediatricians and all obstetricians, inaccurately identified mastitis as a contraindication for breastfeeding. Although still not ideal, only 43.7% of GPs and 50% of midwives shared this misconception ($p = 0.001$) (Table 3). More than three-quarters (75.2%) of all the HCWs were aware that breastfeeding is contraindicated in mothers living with HIV infection with cracked nipples.

Seventy percent (70.1%) of the HCWs, including six of the ten paediatricians, all eight of the obstetricians, and 78.9% ($n = 56$) of GPs, knew that the use of cytotoxics and antineoplastics are contraindications for breastfeeding. In contrast, significantly fewer ($n = 12$, 42.9%) midwives possessed this knowledge ($p = 0.001$). Only 23.1% and 6% of the HCWs knew that galactosemia and phenylketonuria are contraindications for breastfeeding. Moreover, the knowledge of when breastfeeding is recommended for mothers living with HIV was significantly divergent among the HCWs ($p < 0.001$). In total, 73.5% of the HCWs were knowledgeable about the recommendation for breastfeeding among HIV-infected mothers. Six of the ten (60%) paediatricians and five of the eight (62.5%) obstetricians indicated that breastfeeding should never be recommended for mothers living with HIV. Some 15.4% of the HCWs were unsure of the recommendation for breastfeeding among mothers with HIV infection. Almost 54% of the total group of

Table 3: Knowledge of contra-indications of breastfeeding

Questions	Total *N* = 117	GP *n* = 71	Midwives *n* = 28	Paediatricians *n* = 10	Obstetricians *n* = 8	*p*-value
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	
Knowledge pertaining to the contraindications for breastfeeding						
1. Which of the following are contraindications for breastfeeding? (you can choose more than one option)						
Mastitis	62 (53.0)	31 (43.7)	14 (50.0)	9 (90.0)	8 (100.0)	**0.001**
Cracked/bleeding nipples (HIV –)	12 (10.3)	7 (9.9)	5 (17.9)	0 (0.0)	0 (0.0)	0.400
Cracked/bleeding nipples (HIV +)	88 (75.2)	53 (74.6)	19 (67.9)	10 (100.0)	6 (75.0)	0.223
Tuberculosis	16 (13.7)	10 (14.1)	6 (21.4)	0 (0.0)	0 (0.0)	0.295
Maternal diabetes	1 (0.9)	0 (0.0)	1 (3.6)	0 (0.0)	0 (0.0)	0.397
Rheumatoid arthritis	6 (5.1)	6 (8.4)	0 (0.0)	0 (0.0)	0 (0.0)	0.424
Epilepsy	8 (6.8)	3 (4.2)	2 (7.1)	3 (30.0)	0 (0.0)	0.056
Use of cytotoxics and antineoplastics	82 (70.1)	56 (78.9)	12 (42.9)	6 (60.0)	8 (100.0)	**0.001**
Phenylketonuria	7 (6.0)	5 (7.0)	2 (7.1)	0 (0.0)	0 (0.0)	1.000
Cytomegalovirus (CMV)	13 (11.1)	10 (14.1)	3 (10.7)	0 (0.0)	0 (0.0)	0.650
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	1 (0.9)	0 (0.0)	1 (3.6)	0 (0.0)	0 (0.0)	0.392
Not regained birthweight by 10 days	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	-
Premature infants requiring ICU admission	14 (12.0)	9 (12.7)	5 (17.9)	0 (0.0)	0 (0.0)	0.444
Infant with Gastroesophageal reflux disease (GERD)	6 (5.1)	2 (2.8)	4 (14.3)	0 (0.0)	0 (0.0)	0.144
Secondary lactose intolerance	2 (1.7)	1 (1.4)	1 (3.6)	0 (0.0)	0 (0.0)	0.632
Galactosemia	27 (23.1)	16 (22.5)	4 (14.3)	5 (50.0)	2 (75.0)	0.143
Knowledge pertaining to breastfeeding in the context of HIV						
2. When is breastfeeding recommended for an HIVHI- infected mother?						
Never	13 (11.1)	2 (2.8)	0 (0.0)	6 (60.0)	5 (62.5)	< 0.001
Always, if lifelong ART intervention is available and adhered to	86 (73.5)	60 (84.5)	20 (71.5)	3(30.0)	3 (37.5)	
Unsure	18 (15.4)	9 (12.7)	8 (28.6)	1 (10.0)	0 (0.0)	
3. Up to what age of the infant can an HIV -infected mother breastfeed according to the newest 2016 WHO guidelines (exclusive plus continued breastfeeding)?						
Correct response (Up to 2 years and beyond while being fully supported for ART adherence)	54 (46.1)	35 (49.3)	14 (50.0)	2 (20.0)	3 (37.5)	**0.039**

Correct responses are shown in bold.

HCWs were unaware that the WHO guidelines advocate breastfeeding for HIV-positive mothers for up to 2 years and beyond, provided they receive comprehensive support for adhering to antiretroviral therapy (Table 3).

Attitudes of healthcare workers towards breastfeeding

Table 4 shows the attitude of HCWs towards breastfeeding. After evaluating the HCWs' opinion on uninterrupted skin-to-skin contact post-birth, a majority (93.1%) correctly believed it aids colostrum flow. Additionally, when questioned about their confidence in effectively demonstrating proper breastfeeding positioning and attachment to new mothers, a significantly larger proportion of midwives ($n = 21$, 75%) expressed high confidence compared to only four of the ten paediatricians, one of the eight obstetricians, and 25.3% ($n = 18$) of GPs ($p < 0.001$). Similarly, a significantly higher percentage of the midwives ($n = 22$, 78.6%) felt highly confident in giving breastfeeding advice than paediatricians (four of the ten), obstetricians (one of the eight) and GPs ($n = 28$, 39.4%) ($p < 0.001$). Only 41% of HCWs felt highly confident to give mothers advice on how to treat breastfeeding complications.

There were significant differences in opinions among the HCWs regarding the use of pacifiers and/or bottles for breastfed infants. The majority of GPs i.e. ($n = 51$, 71.8%) and 85.7% ($n = 24$) of the midwives would not recommend bottles and pacifiers for breastfed infants, compared to three of the ten (30%) paediatricians and two of the eight (25%) obstetricians ($p = 0.001$). Five of the ten (50%) paediatricians and six6 of the eight (75%) obstetricians believed frenectomy should never be done before the age of 6 months, in contrast to 29.6% ($n = 21$) of GPs and 25.9% ($n = 7$) of midwives, who believed it should be done if either the infant or mother is experiencing breastfeeding difficulties. However, 30% ($n = 3$) of the paediatricians considered the procedure to be appropriate when an infant is older, a difference that was statistically significant ($p < 0.001$).

According to most midwives ($n = 22$, 78.6%), mothers should feel comfortable breastfeeding in public, but cover themselves and their babies. However, six of the ten (60%) paediatricians, all eight (100%) obstetricians, and 49.3% ($n = 35$) of the GPs feel that breastfeeding in public is inappropriate. Furthermore, more than half of HCWs (56%), including five of the ten (50%) paediatricians, seven of the eight (87.5%) obstetricians, 63.4% ($n = 45$) of GPs, and 42.9% ($n = 12$) of midwives had never completed the 20-hour WHO Lactation Management Training.[32] Moreover, seven of the ten (70%) paediatricians, all obstetricians, and 56.3% ($n = 41$) of the GPs expressed dissatisfaction with the breastfeeding training provided during their education for their current career path, feeling it did not adequately equip them to support and educate breastfeeding mothers. In contrast, more than half of the midwives, ($n = 16$, 57.1%) found their breastfeeding training adequate to equip them to support and educate breastfeeding mothers, indicating a significant difference in the opinions of the HCWs ($p = 0.048$).

Practices of healthcare workers pertaining to breastfeeding support

Table 5 shows the practices of HCWs regarding breastfeeding. Approximately 60.6% of the HCWs (64.8% of GPs and 71.4% of midwives) encourage mothers to breastfeed within half an hour after birth, while six of the ten (60%) of the paediatricians and four of the eight (50%) of the obstetricians recommend breastfeeding within an hour after birth. Only 39.3% of the HCWs reported that they recommend breastfeeding with complementary feeding up to 24 months, while a lower proportion (28.3%) reported encouraging breastfeeding up to 24 months and beyond. The majority of the HCWs (75.2%), including 80.3% of GPs and 89.3% of midwives, correctly stated that recommending breastmilk with a cup is appropriate when the mother and baby are separated after birth due to an unforeseen circumstance, and the mother can still express sufficient breastmilk. In contrast, six of the ten (60%) paediatricians and four of the eight (50%) obstetricians reported recommending formula milk with a cup in such situations.

When addressing hypoglycaemia in babies, the majority of paediatricians ($n = 7$, 70%) and obstetricians ($n = 7$, 87.5%) would advise oral glucose administration. In contrast, 57.7% ($n = 41$) of GPs and 71.5% ($n = 20$) of midwives would recommend expressed colostrum with a syringe ($p < 0.001$), and the majority of GPs ($n = 57$, 80.3%) and midwives ($n = 22$, 78.6%), compared to less than half of the paediatricians ($n = 4$, 40%) and obstetricians ($n = 3$, 37.5%) would recommend 24-hour rooming-in, a difference that was statistically significant ($p = 0.015$). If a baby fails to regain their birthweight by two weeks of age without any medical conditions, six of the ten (60%) paediatricians would advise supplementing with formula. Conversely, all obstetricians, and the majority of GPs (60.6%), and midwives (78.6%), would recommend increasing breastfeeding frequency to the mother. In instances where a mother is struggling with painful nipples, 89.7% of all the HCWs, including 100% of paediatricians and obstetricians, 88.7% of GPs, and 85.7% of midwives, correctly indicated that they advocate for improved positioning and attachment of the baby onto the breast. Additionally, over half of the HCWs (54.7%), including 60% of paediatricians, 50% of obstetricians, 52.1% of GPs, and 60.7% of midwives, would advise a mother with low milk production to increase breastfeeding frequency. Only two of the ten (20%) paediatricians and one of the eight (12.5%) obstetricians compared to 39.4% ($n = 28$) of GPs and 35.7% ($n = 10$) of midwives indicated that they would assess a breastfeeding session to ascertain proper positioning and attachment ($p = 0.009$). The majority of HCWs (65%), comprising 40% of paediatricians, 50% of obstetricians, 63.4% of GPs, and 82.1% of midwives, indicated that they recommend breastfeeding support groups to mothers on discharge. Only 21.4% of HCWs reported recommending lactating specialists to mothers for breastfeeding support on discharge.

Discussion

This study investigated the knowledge, attitude, and support practices of HCWs regarding breastfeeding promotion in comparison with the 2016 WHO Guideline updates on HIV and infant feeding and the 2018 MBFI 10 Steps to Successful Breastfeeding. The study identified deficiencies in knowledge, and underscores the need for comprehensive breastfeeding education among HCWs. According to the revised 2018 WHO/UNICEF Baby-Friendly Hospital Initiative (BFHI), all healthcare providers must have the competence and skills to implement the BFHI through undergraduate and in-service training.[43] This implies that every HCW providing maternal and child care services is required to possess knowledge of, and adhere to, the established policies of the BFHI to ensure that all mothers and infants receive consistent and equitable care that is not dependent on the preferences of the care provider.[43]

Table 4: Attitudes of health carehealthcare workers towards breastfeeding

Questions	Total *n* = 117 *n* (%)	GP *n* = 71 *n* (%)	Midwives *n* = 28 *n* (%)	Paediatricians *n* = 10 *n* (%)	Obstetricians *n* = 8 *n* (%)	*p*-value
Attitudes pertaining to breastfeeding						
1. What is your opinion about uninterrupted skin-to-skin contact immediately after birth? (choose only one option)						
There is no time for it	5 (4.3)	3 (4.2)	2 (7.1)	0 (0.0)	0 (0.0)	0.140
Is not important for breastfeeding performance	3 (2.6)	0 (0.0)	3 (10.7)	0 (0.0)	0 (0.0)	
Helps the flow of colostrum after birth	109 (93.1)	68 (95.8)	23 (82.1)	10 (100)	8 (100)	
2. 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	4 (3.4)	2 (2.8)	2 (7.1)	0 (0.0)	0 (0.0)	0.067
It should only be done in unique situations such as premature births	73 (62.4)	37 (52.1)	21 (75.0)	8 (80.0)	7 (87.5)	
It can cause harmful stress to the baby	40 (34.2)	32 (45.1)	5 (17.9)	2 (20.0)	1 (12.5)	
It should be done for all Caesarean births	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
3. 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	5 (4.3)	5 (7.0)	0 (0.0)	0 (0.0)	0 (0.0)	< 0.001
Low confidence	14 (12.0)	14 (19.3)	0 (0.0)	0 (0.0)	0 (0.0)	
Moderately confident	54 (46.2)	34 (47.9)	7 (25.0)	6 (60.0)	7 (87.5)	
Highly confident	44 (37.5)	18 (25.3)	21 (75.0)	4 (40.0)	1 (12.5)	
4. How confident do you feel to give mothers breastfeeding advice?						
Not at all confident	3 (2.6)	3 (4.2)	0 (0.0)	0 (0.0)	0 (0.0)	0.005
Low confidence	9 (7.7)	9 (12.7)	0 (0.0)	0 (0.0)	0 (0.0)	
Moderately confident	50 (42.7)	31 (43.7)	6 (21.4)	6 (60.0)	7 (87.5)	
Highly confident	55 (47.0)	28 (39.4)	22 (78.6)	4 (40.0)	1 (12.5)	
5. 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	2 (1.7)	2 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)	0.343
Low confidence	15 (12.8)	12 (16.9)	3 (10.7)	0 (0.0)	0 (0.0)	
Moderately confident	52 (44.4)	28 (39.4)	11 (39.3)	6 (60.0)	7 (87.5)	
Highly confident	48 (41.0)	29 (40.8)	14 (50.0)	4 (40.0)	1 (12.5)	
6. 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	22 (18.8)	10 (14.1)	4 (14.3)	5 (50.0)	3 (37.5)	0.001
I do not recommend the use of pacifiers and/or bottles	80 (68.4)	51 (71.8)	24 (85.7)	3 (30.0)	2 (25.0)	
Other – please comment	15 (12.8)	10 (14.1)	0 (0.0)	2 (20.0)	3 (37.5)	
7. 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	29 (25.0)	21 (29.6)	7 (25.9)	1 (10.0)	0 (0.0)	< 0.001
It should be done only if both the mother and baby are experiencing breastfeeding difficulties	16 (13.8)	15 (21.1)	1 (3.7)	0 (0.0)	0 (0.0)	
It should be done when the infant is older	17 (14.7)	9 (12.7)	5 (18.5)	3 (30.0)	0 (0.0)	
It should not be done at all	16 (13.8)	4 (5.6)	1 (3.7)	5(50.0)	6 (75.0)	
Don't know	38 (32.7)	22 (31.0)	13 (48.1)	1 (10.0)	2 (25.0)	
8. What is your attitude toward breastfeeding in public?						
Breastfeeding is natural and mothers should feel comfortable to breastfeed in public	4 (3.4)	4 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)	**0.001**
Mothers should feel comfortable to breastfeed in public but should cover herself and her baby while breastfeeding	57 (48.7)	31 (43.7)	22 (78.6)	4 (40.0)	0 (0.0)	

(*Continued*)

Table 4: Continued.

Questions	Total *n* = 117 *n* (%)	GP *n* = 71 *n* (%)	Midwives *n* = 28 *n* (%)	Paediatricians *n* = 10 *n* (%)	Obstetricians *n* = 8 *n* (%)	*p*-value
Public breastfeeding is inappropriate	55 (47.0)	35 (49.3)	6 (21.4)	6 (60.0)	8 (100.0)	
Other	1 (0.9)	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	
Breastfeeding training						
1. When did you receive the 20-hour WHO Lactation Management Training?						
During the last 6 months	1 (0.9)	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	0.082
During the last year	9 (7.7)	8 (11.3)	1 (3.6)	0 (0.0)	0 (0.0)	
Two–four years ago	19 (16.1)	10 (14.1)	7 (25.0)	2 (20.0)	0 (0.0)	
Five–ten years ago	7 (6.0)	4 (5.6)	1 (3.6)	2 (20.0)	0 (0.0)	
More than 10 years ago	12 (10.3)	3 (4.2)	7 (25.0)	1 (10.0)	1 (12.5)	
Never	69 (56.0)	45 (63.4)	12 (42.9)	5 (50.0)	7 (87.5)	
2. 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	45 (38.5)	26 (36.6)	16 (57.1)	3 (30.0)	0 (0.0)	0.048
No	65 (55.5)	40 (56.3)	10 (35.7)	7 (70.0)	8 (100.0)	
Don't know	7 (6.0)	5 (7.0)	2 (7.1)	0 (0.0)	0 (0.0)	

It is well known that exclusive breastfeeding during the first six months of an infant's life is a global recommendation, established by the WHO and UNICEF. It prohibits the provision of any food or liquid (including water) to newborns, unless medically indicated, and encourages feeding on demand, i.e. as often as the baby wants to feed, both day and night, without any time limitations.[43] In the present study, approximately 41% of the HCWs did not have an accurate understanding of exclusive breastfeeding, while 32.5% did not know until what age exclusive breastfeeding is recommended, whereas 20.5% believed that exclusively breastfed infants need additional water. In a similar study in Tanzania, that investigated the predictors of exclusive breastfeeding knowledge and good practice among HCWs, it was reported that the exclusive breastfeeding knowledge score of 48% of the respondents in their study was undesirable. Additionally, over half (53%) of HCWs interviewed gave an incorrect definition of exclusive breastfeeding and 69.5% believed that a baby crying a lot was justification for feeding other foods and liquids before the first four months of age.[44]

Notably, several studies have established the manifold benefits of exclusive breastfeeding. Exclusive breastfeeding provides complete nutrition for the first six months of life and prevents life-threatening infections in infants. Additionally, it confers health advantages for mothers by reducing the risk of breast and ovarian cancers.[10,45,46] Therefore, breastfeeding should not be viewed solely as a lifestyle choice; rather, it should be recognised as a critical intervention, which warrants full support, promotion, protection, and endorsement by HCWs.[11] HCWs, especially those in primary healthcare, are in an advantageous position to spearhead the counselling of mothers on exclusive breastfeeding. However, in the current study, only approximately half (53%) and a quarter (26.7%) of HCWs were capable of identifying three benefits of breastfeeding for the baby and the mother, respectively. An even more concerning finding was made in a child feeding training intervention study conducted in Nigeria among HCWs, where only 4.8% could name three benefits of breastfeeding for the baby, and merely 29.8% could enumerate three benefits for the mother.[47] Healthcare workers need relevant educational support and skill development to effectively guide and empower mothers to breastfeed successfully, particularly when dealing with infant behaviour that may lead mothers to incorrectly consider alternatives to exclusive breastfeeding. They should provide anticipatory guidance, beginning during pregnancy and continuing after birth, to prepare mothers and other caregivers to manage these behaviours in order to promote continued, successful breastfeeding.[10]

In South Africa, the MBFI is an adaptation of the WHO/UNICEF BFHI policy to include the mother-friendly component, infant feeding in the context of HIV, and the International Code of Marketing of Breastmilk Substitutes and subsequent World Health Assembly resolutions by the South African Department of Health.[22,48] In 2011, the South African Department of Health (SA DoH) committed to promoting, protecting, and supporting exclusive breastfeeding as a public health intervention by adopting the Tshwane Declaration of Support for Breastfeeding, and renamed the BFHI to the MBFI.[49,50] Even though the SA DoH has adopted the MBFI, the knowledge of the HCWs in the present study regarding the MBFI was generally inadequate. Only 14.5% of HCWs could identify at least one step from the MBFI 10 Steps to Successful Breastfeeding. Additionally, over half of HCWs (55.6%) were unaware of what is considered acceptable under the International Code of Marketing of Breastmilk Substitutes. This suggests that the first two health system procedural steps of the BFHI 10 steps, which encourage (1a) the full compliance with the International Code of Marketing of Breastmilk Substitutes, as well as (1b) having a written infant feeding policy that is routinely communicated to staff and parents and (1c) establishing an ongoing monitoring and data-management system, together with (2) ensuring that staff have sufficient knowledge, competence, and skills to support breastfeeding, are not implemented at the facility level in this district.[43] According to the Lancet 2016 series on breastfeeding, maternal healthcare systems and facilities that do not prioritise the BFHI 10 steps undermine successful breastfeeding because the BFHI steps are essential for

Table 5: Practices of healthcare workers pertaining to breastfeeding support

Questions	Total *n* = 117 *n* (%)	GP *n* = 71 *n* (%)	Midwives *n* = 28 *n* (%)	Paediatricians *n* = 10 *n* (%)	Obstetricians *n* = 8 *n* (%)	*p*-value
Practices pertaining to breastfeeding						
1. How long after birth do you encourage mothers to initiate breastfeeding?						
Within half an hour after birth	71 (60.6)	46 (64.8)	20 (71.4)	4 (40.0)	1 (12.5)	0.014
One hour after birth	27 (23.1)	13 (18.3)	4 (14.3)	6 (60.0)	4 (50.0)	
Four hours after birth	4 (3.4)	4 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)	
Four hours or more after birth	14 (12.0)	7 (9.9)	4 (14.3)	0 (0.0)	0 (0.0)	
Other	1 (0.9)	1 (1.4)	0 (0.0)	0 (0.0)	3 (37.5)	
2. Up to what age do you recommend continued breastfeeding together with complementary feeding?						
8 months	2 (1.7)	1 (1.4)	1 (3.6)	0 (0.0)	0 (0.0)	0.369
12 months	33 (28.2)	16 (22.5)	7 (25.0)	4 (40.0)	6 (75.0)	
24 months	46 (39.3)	29 (40.8)	11 (39.3)	4 (40.0)	2 (25.0)	
24 months or beyond	33 (28.3)	23 (32.4)	8 (28.7)	2 (20.0)	0 (0.0)	
Other	3 (2.6)	2 (2.8)	1 (3.6)	0 (0.0)	0 (0.0)	
3. If a mother and baby are separated after birth due to an inadvertent situation and the mother is still able to express enough breastmilk, what feeding method would you recommend for the infant?						
Formula milk with a cup	16 (13.7)	6 (8.4)	0 (0.0)	6 (60.0)	4 (50.0)	< 0.001
Breastmilk with a bottle	7 (6.0)	6 (8.4)	1 (3.6)	0 (0.0)	0 (0.0)	
Breastmilk with a cup	88 (75.2)	57 (80.3)	25 (89.3)	4 (40.0)	2 (25.0)	
Formula milk with a bottle	6 (5.1)	2 (2.8)	2 (7.1)	0 (0.0)	2 (25.0)	
4. What would you recommend when a baby is hypoglycaemic?						
Oral glucose administration	29 (24.8)	13 (18.3)	2 (7.2)	7 (70.0)	7 (87.5)	< 0.001
Formula milk with a bottle	10 (8.6)	6 (8.4)	4 (14.3)	0 (0.0)	0 (0.0)	
Formula milk with a cup	3 (2.6)	3 (4.2)	0 (0.0)	0 (0.0)	0 (0.0)	
Expressed colostrum with a syringe	65 (55.5)	41 (57.7)	20 (71.4)	3 (30.0)	1 (12.5)	
IV infusion	2 (1.7)	0 (0.0)	2 (7.1)	0 (0.0)	0 (0.0)	
Other – please comment	8 (6.8)	8 (11.3)	0 (0.0)	0 (0.0)	0 (0.0)	
5. Choose only one of the following:						
I recommend rooming 24 hours a day	86 (73.5)	57 (80.3)	22 (78.6)	4 (40.0)	3 (37.5)	0.015
I recommend rooming for most part of the day but taking the baby to the baby room at night so that the mother can rest	27 (23.1)	11 (15.5)	5 (17.9)	6 (60.0)	5 (62.5)	
I do not recommend rooming at all because mothers tend to struggle to cope with their babies in the same room	3 (2.5)	2 (2.8)	1 (1.4)	0 (0.0)	0 (0.0)	
Other – please comment	1 (0.9)	1 (3.6)	0 (0.0)	0 (0.0)	0 (0.0)	
6. 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	19 (16.2)	9 (12.7)	4 (14.3)	6 (60.0)	0 (0.0)	0.010
Stop breastfeeding and give only formula milk	1 (0.9)	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	
Encourage the mother to breastfeed more often	75 (64.1)	43 (60.6)	22 (78.6)	2 (20.0)	8 (100.0)	
Refer the mother to a lactation specialist	18 (15.4)	15 (21.1)	2 (7.1)	1 (10.0)	0 (0.0)	
Other – please comment	4 (3.4)	3 (4.2)	0 (0.0)	1(10.0)	0 (0.0)	
7. What would you recommend to a mother experiencing painful nipples? (choose only one option)						
Use a nipple shield	5 (4.3)	3 (4.2)	2 (7.2)	0 (0.0)	0 (0.0)	0.969
Temporarily discontinue breastfeeding and formula feed	2 (1.7)	2 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)	
Try better positioning and attachment of the baby onto the breast	105 (89.7)	63 (88.7)	24 (85.7)	10 (100.0)	8 (100.0)	
Push through and continue breastfeeding because breastfeeding is painful during the first few days	5 (4.3)	3 (4.2)	2 (7.1)	0 (0.0)	0 (0.0)	

(*Continued*)

Table 5: Continued.

Questions	Total	GP	Midwives	Paediatricians	Obstetricians	*p*-value
	n = 117 *n* (%)	*n* = 71 *n* (%)	*n* = 28 *n* (%)	*n* = 10 *n* (%)	*n* = 8 *n* (%)	
8. What would you recommend to a mother with low milk production? (choose only one option)						
Top up with formula milk using a bottle	4 (3.4)	4 (5.6)	0 (0.0)	0 (0.0)	0 (0.0)	0.009
Top up with formula milk using a cup	3 (2.6)	2 (2.8)	1 (3.6)	0 (0.0)	0 (0.0)	
Encourage her to breastfeed more often	64 (54.7)	37 (52.1)	17 (60.7)	6 (60.0)	4 (50.0)	
Encourage her to use galactagogues	5 (4.3)	0 (0.0)	0 (0.0)	2 (20.0)	3 (37.5)	
Evaluate a breastfeed session to determine correct positioning and attachment	41 (35.0)	28 (39.4)	10 (35.7)	2 (20.0)	1 (12.5)	
Suggested breastfeeding support						
9. What support do you suggest to breastfeeding mothers on discharge? (you can choose more than one option)						
Breastfeeding support group	76 (65.0)	45 (63.4)	23 (82.1)	4 (40.0)	4 (50.0)	0.055
Lactation specialist	25 (21.4)	19 (26.8)	5 (17.9)	3 (30.0)	0 (0.0)	0.297
List of resources for breastfeeding help	52 (44.4)	30 (42.2)	14 (50.0)	4 (40.0)	4 (50.0)	0.869
Gynaecologist	11 (9.4)	10 (14.1)	1 (3.6)	0 (0.0)	0 (0.0)	0.288
Paediatrician	12 (10.3)	8 (11.3)	3 (10.7)	1 (10.0)	0 (0.0)	1.000
General practitioner	8 (6.8)	8 (11.3)	0 (0.0)	0 (0.0)	0 (0.0)	0.241
Midwife	50 (43.7)	28 (39.4)	14 (50.0)	4 (40.0)	4 (50.0)	0.771
None	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	

preparing for and supporting lactation. Inadequate BFHI support from the health system is evident in poor staff training on breastfeeding and marketing practices that violate the WHO's International Code for the Marketing of Breastmilk Substitutes. Inadequate support from health systems or facilities reduces the likelihood of successful breastfeeding.[10] As of the 2016/2017 financial year, 405 out of 545 (74%) public health facilities in South Africa were accredited with MBFI status, whereas only six private facilities received accreditation.[51] It is therefore not surprising that health professionals in private facilities in South Africa were reported to be more likely to recommend commercial formula top-ups, which contradicts the MBFI policy for successful breastfeeding.[36] In our study, 60% of the paediatricians and 50% of the obstetricians reported that they advise mothers to supplement breastmilk with formula if a baby fails to regain their birthweight by two weeks of age without any medical reason to do so. HCWs are responsible for enforcing the R991 regulations, which is South Africa's legislation implementing the International Code of Marketing of Breastmilk Substitutes. This regulation is crucial for protecting and promoting breastfeeding.[52] In recent years, MBFI accreditation of facilities has been phased out following the 2018 revision of the WHO/UNICEF 10 Steps to Successful Breastfeeding, which mandated these steps as a standard of care for all healthcare facilities providing maternal and child services. Hence, the process of MBFI accreditation of facilities has also been phased out in South Africa.[53] which has contributed to some facilities struggling to maintain the MBFI practices.[50]

In the context of South Africa, where HIV infection affects approximately 22.3% of women of reproductive age,[54] it is imperative for HCWs, especially those working in maternal and child care, to have knowledge of the latest breastfeeding recommendations for such women. According to the WHO, mothers living with HIV can exclusively breastfeed their infants for the first 6 months of life and continue to breastfeed together with adequate complementary feeding up to 24 months and beyond, while the mother is fully supported for adherence to antiretroviral therapy.[43] In the current study, about 26.5% of HCWs were unaware of this recommendation, of whom 60% of paediatricians and 62.5% of obstetricians held the belief that breastfeeding should never be recommended for an HIV-infected mother. Additionally, more than half (53.9%) of the HCWs were unaware of the age specified in the updated 2018 WHO/UNICEF BFHI guidelines, which outline the duration up to which mothers living with HIV can breastfeed. These results align with the findings of Samuel et al.[47] in a study conducted in Nigeria, which reported that only 12.9% of HCWs advocated for breastfeeding among HIV-infected mothers.

Diverse attitudes toward breastfeeding among HCWs have been linked to lower global breastfeeding rates.[55] HCWs' attitudes toward breastfeeding influence their likelihood of acquiring knowledge about and supporting breastfeeding practices.[39] This is evident in the present study, in which a significant majority of the midwives felt highly confident about giving breastfeeding advice and effectively demonstrating correct breastfeeding positioning and attachment to new mothers, compared to the lower proportion of paediatricians, obstetricians, and GPs who shared this confidence. Consistent with the aforementioned lack of confidence among paediatricians, obstetricians, and GPs, a significantly greater percentage believed that the breastfeeding training they received during their training was not adequate and did not equip them to support and educate breastfeeding mothers, in contrast to a smaller percentage of midwives who held a similar belief. Consistent with our findings, a study conducted in Canada, which examined the attitudes of obstetricians-gynaecologists and residents toward breastfeeding counselling, indicated that only 16% of obstetricians-gynaecologists and 22% of residents felt they had received sufficient training on supporting mothers to breastfeed.[56]

Moreover, we identified inconsistent and conflicting advice among the various HCWs in the current study, in line with what has been previously observed in other studies.[40,57] There were significant variations among recommendations of HCWs regarding how long mothers should initiate breastfeeding after birth, how long they should breastfeed exclusively and when to add complementary feeding, and what to do if an infant is hypoglycaemic or does not regain birthweight within two weeks.

The findings of the current study indicate discrepancies in the knowledge, attitude, and support practices of HCWs regarding breastfeeding in comparison with the 2018 WHO/UNICEF BFHI and MBFI recommendations and the 2016 WHO guideline updates on HIV and infant feeding. According to breastfeeding promotion experts, the most critical management procedure for the successful implementation of the MBFI is ensuring that staff have sufficient knowledge, competence, and skills to support breastfeeding.[50] Challenges include lack of in-service training for medical doctors, high staff turnover, inadequate screening of trainers, poor training methods, and a reluctance of HCWs to attend the 20-hour WHO Lactation Management Training due to staff shortages, and a lack of mentorship.[50]

This study highlights the need for regular training on breastfeeding and infant feeding counselling at the facility level to ensure that all HCWs involved with maternal and child care are sufficiently equipped with the knowledge, competence, and skills to efficiently support breastfeeding mothers, as more than half of the HCWs had not completed the 20-hour WHO Lactation Management Training.[32] In this regard, the National Department of Health could consider collaborating with universities to create an online MBFI training platform for professional development of HCWs, similar to the Indian computer-based breastfeeding training module validated for use by South African Undergraduate Dietetic students.[58] Such a platform could be supported by stakeholders in academia, the private sector, civil society, non-governmental organisations, and professional associations. Additionally, the curriculum of tertiary qualification programmes for most health professions, especially the nursing and medical programmes, could devote adequate training and time to building skills and knowledge for effective breastfeeding support. There is evidence showing that breastfeeding training enhances healthcare workers' confidence and self-efficacy in offering evidence-based support to breastfeeding mothers.[59]

The findings of this study are limited by the small sample size, restricting its generalizability. However, the findings are applicable in the local context and have brought to light the urgent need for breastfeeding training to improve the knowledge, competence, and skills of HCWs in the Free State province.

Conclusion

The findings of the current study identified that a significant proportion of HCWs lacked confidence in supporting breastfeeding mothers due to knowledge deficits and support practices that were not aligned with the 2016 WHO guideline updates on HIV and infant feeding and the 2018 MBFI 10 Steps to Successful Breastfeeding. Regular breastfeeding training of HCWs on the latest breastfeeding guidelines is necessary to equip HCWs with the knowledge and competence to successfully promote, protect, and support breastfeeding.

Author contribution

IH: conceptualisation, methodology, execution of study, and interpretation of results. JAC: interpretation of results and manuscript preparation. MN: statistical analysis. CMW: conceptualisation, interpretation of results, methodology, principal investigator. All authors read and edited the final manuscript.

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