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The Knowledge-Practice Gap in Exclusive Breastfeeding and Milk Expression Among Healthcare Providers: A Hospital-Based Cross-sectional Study in Kigali, Rwanda

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Abstract

Background

Despite being primary advocates for exclusive breastfeeding (EBF), healthcare providers (HCPs) faced unique workplace challenges that hinder its practice. This study assessed the knowledge, practices, and barriers to EBF among HCPs in three selected hospitals in Kigali, Rwanda.

Methods

A cross-sectional study was conducted among 60 HCPs (nurses, midwives, and doctors) using a structured questionnaire. Descriptive statistics were used to analyze demographic characteristics, EBF facilitators, milk expression practices, and perceived barriers. Data were analyzed using Stata version 17.0.

Results

Of the 60 HCPs interviewed, most participants were aged 35–44 years (51.7%) and held a Bachelor's degree or higher (63.3%). Although knowledge of EBF benefits was near-universal (98–100%), the 6 months EBF practice rate was only 11.7%, with 85% practicing mixed feeding. The majority (63.3%) were unable to express breast milk at work. Key barriers included lack of time (55%), inadequate colleague support (21.7%), and perceived insufficient milk production (41.5%). Most respondents (65%) considered hospital policies unsupportive for EBF, while 46.7% recommended flexible work hours as the most needed support.

Conclusions

A critical knowledge-practice gap exists among HCPs in Kigali.Healthcare providers reported workplace constraints that may negatively influence EBP practices. Hospitals need formal lactation policies, designated expression spaces, and flexible scheduling to support breastfeeding HCPs.

Background

Exclusive breastfeeding (EBF) is more than a clinical recommendation; it is a vital foundation for a child's future. The World Health Organization (WHO) and UNICEF(1, 2) recommend EBF during the first six months of life because it offers profound benefits for infant survival, growth, and development. Research shows that EBF reduces infant mortality, provides essential nutrients, enhances immunity, and decreases the risk of infections and chronic diseases. The global target set by the World Health Assembly aimed to increase EBF rates to at least 50% by 2025(3), yet significant disparities persisted across regions and

populations. As of 2023, global EBF rates reached 48%(2), marking progress but still leaving nearly 60% of infants without the recommended exclusive nutrition during their critical first six months.

This struggle is uniquely felt by healthcare providers (HCPs). These women are frontline advocates for maternal and child health, yet many counsel patients on the life-saving benefits of EBF while facing workplace conditions that make it difficult to practice EBF themselves. This "knowledge-practice gap" was a global phenomenon documented across multiple continents. In Malaysia, 58.3% of healthcare providers experienced unsuccessful exclusive breastfeeding(4), and in Ghana, only 53.1% of nurses and midwives practiced EBF(5). In parts of Nigeria, studies among health care workers showed suboptimal EBF rates, with some tertiary settings recording rates as low as 3%(6). These figures revealed a troubling truth—that medical expertise was often no match for a workplace that did not allow a mother the time or space to fulfill her own breastfeeding intentions.

The return to work is often the moment when EBF begins to fail. For a nurse, midwife, or doctor, the workday is defined by high-stakes decisions, long hours, and the physical and emotional exhaustion of patient care. Research across multiple settings identified common workplace barriers including inadequate facilities for milk expression, lack of flexible work schedules, insufficient maternity leave, unsupportive workplace cultures, and a lack of empathy from colleagues and management(7). A systematic review of workplace interventions demonstrated that despite progressive legislation in some regions, women experienced persistent barriers due to lack of schedule control, unyielding workloads, and the absence of private, clean spaces for milk expression(8). In many health systems, particularly in hospital workplaces, these challenges were intensified by inadequate facilities, lack of breastfeeding breaks, high workload, and absence of formal institutional policies protecting breastfeeding breaks(9).

In Rwanda, the situation for healthcare providers is particularly demanding and paradoxical. Rwanda has been recognized globally for its high national EBF rates of approximately 81%(10). Furthermore, Rwanda recently extended maternity leave to 14 weeks (11), and UNICEF Rwanda has called on both public and private sectors to invest in breastfeeding spaces, paid breastfeeding breaks, and extended parental leave. However, despite these progressive national policies, EBF declined from 87.3% in 2015 to 80.9% in 2020(12), suggesting an implementation gap between policy and practice. Healthcare providers work in high-pressure environments where the duty to the patient often leaves little room for personal health needs. There is a deep irony in a midwife delivering a healthy baby and teaching a new mother how to latch, only to realize she has no place to express milk for her own child during a 12-hour shift.

Despite the progress Rwanda had made in maternal health, the voices of healthcare providers in Kigali remained largely unheard. The discrepancy between high national EBF rates and the lived experiences of healthcare providers suggests that, while population-level interventions succeeded, facility-level implementation of Baby-Friendly Hospital Initiative (BFHI) guidelines and workplace support systems lagged behind(13).

This study sought to explore the underlying factors contributing to suboptimal EBF practices among healthcare professionals in Kigali. Specifically, it aimed to determine the proportion of HCPs who were

exclusively breastfeeding their babies, assess their knowledge of EBF and breastmilk expression, and identify perceived barriers and facilitators to maintaining exclusive breastfeeding within hospital settings.

Methods

Study Design

This study employed a descriptive cross-sectional design using quantitative methods. The design was chosen to provide a point-in-time assessment of the prevalence of exclusive breastfeeding (EBF) and milk expression practices, alongside the perceived barriers and facilitators among healthcare provider mothers.

Setting

The study was conducted at three public hospitals in Kigali, Rwanda: Centre Hospitalier Universitaire de Kigali (CHUK), Muhima Hospital, and Kacyiru Hospital. These facilities were among the largest maternal and referral centers in the city, employing a high volume of female healthcare professionals. Data collection occurred from November 1st to 30th, 2024.

Participants

The study population consisted of healthcare providers (HCPs) who were mothers employed at the selected hospitals.

Inclusion criteria

HCPs (nurses, midwives, doctors, and allied health professionals) whose infant was at least 6 months of age at the time of the study, enabling retrospective assessment of EBF for the first six months of life, and who provided written informed consent.

Exclusion criteria

HCP mothers who did not provide informed consent or whose infants were younger than 6 months of age at the time of data collection.

Variables

The primary outcome was exclusive breastfeeding (EBF) status, defined as the infant receiving only breast milk for the first six months. Key exposure variables included workplace barriers (workload, lack of time, absence of lactation rooms), institutional support (maternity leave duration, employer/colleague

support, hospital policy), and milk expression practices (frequency and storage). Sociodemographic variables included age, education level, professional cadre, and number of parities.

Data Sources/Measurement

Data were gathered using a structured, self-administered questionnaire adapted from a validated tool developed by Ishak et al.(4). The original instrument assessed breastfeeding practices and workplace barriers among healthcare workers and comprised sections on sociodemographic characteristics, breastfeeding knowledge and practices, and work-related constraints. For this study, the questionnaire was translated and adapted to the Rwandan hospital context, with minor modifications to wording and the addition of items on local workplace policies and milk expression facilities. The final version was composed by 31 variables and included four sections:demographics, breastfeeding practices (including EBF and milk expression), workplace barriers, and required support systems. It was also reviewed for content validity by experts in maternal and child health.

Bias

To mitigate selection bias, participants were recruited from diverse clinical departments and across three different hospital levels. To address information and recall bias, the study was limited to mothers with infants ≥ 6 months. To reduce social desirability bias,a common risk among HCPs who were knowledgeable about breastfeeding guidelines,total anonymity was guaranteed, and questionnaires were completed in private settings to encourage honest reporting.

Study Sampling Approach and Sample Size

As an exploratory descriptive study targeting a limited accessible population of eligible HCP mothers, a pragmatic sample approach was used, and a total of 60 eligible participants were recruited during the study period. No formal sample size calculation was performed, as the study aimed to capture the entire accessible population of breastfeeding HCPs with infants ≥ 6 months within the one-month recruitment window. The researchers acknowledge that the sample was limited to those currently breastfeeding and available during the study period.

Quantitative Variables

Categorical variables, such as EBF status (Yes/No), frequency of expression (None/Once/Twice or more), and perceived support levels (Supportive/Neutral/Unsupportive), were managed as discrete data points. Age and maternity leave duration were grouped into categorical ranges to facilitate descriptive analysis.

Statistical Methods

Data were analyzed using Stata version 17.0. Descriptive statistics were used to summarize sociodemographic characteristics, breastfeeding practices, knowledge of EBF and expressed milk storage, and perceived workplace barriers and support. Frequencies and percentages were calculated for all categorical variables, and results were presented in tabular form.

To have a picture on factors associated with EBF status, a bivariable analysis was conducted. Fisher's exact test was used to examine associations between EBF status (EBF vs. No EBF) and selected sociodemographic characteristics, breastfeeding practices, knowledge-related variables, and workplace-related factors. Fisher's exact test was chosen over chi-square given the small expected cell frequencies resulting from the limited number of participants who achieved EBF (n = 7). A two-sided P value of less than 0.05 was considered statistically significant. Results of the bivariable analysis are presented alongside descriptive findings to provide additional analytical depth, while acknowledging that the small sample size limits the statistical power and generalizability of these findings.

Ethical Considerations

Ethical approval was obtained from the University of Rwanda (CMHS/IRB/683/2024), and administrative permissions were obtained from the three participating hospitals. Participation was strictly voluntary, and written informed consent was obtained from all participants. To protect the professional and personal identities of the mothers, the study did not collect participant names or other direct identifiers, and all data were anonymized.

Study strengths and limitations

In accordance with STROBE standards, several methodological limitations should be noted. First, the study was limited to 60 breastfeeding HCPs who were available during the one-month recruitment window; the researchers were unable to identify or recruit additional eligible breastfeeding mothers who met the strict inclusion criteria, which may limit the precision and generalizability of the findings. Second, the descriptive cross-sectional design allowed the characterization of current breastfeeding practices and perceived barriers but did not permit causal inferences regarding specific workplace factors and EBF outcomes. Third, reliance on self-reported breastfeeding and expression practices may have introduced recall and social desirability bias, particularly given that participants were health professionals familiar with recommended practices. Finally, by focusing only on HCP mothers who were currently breastfeeding and met the infant age criterion, the study may have missed the perspectives of women who had already discontinued EBF due to workplace or other barriers, potentially underestimating the full extent of challenges to maintaining EBF.

Results

Sociodemographic Characteristics of Participants

A total of 60 healthcare provider mothers participated in the study (100% response rate). The sample was nearly evenly split by age, with 31 participants (51.7%) aged 35–44 years and 29 (48.3%) aged 25–

34 years. Most participants held a bachelor's degree or higher (n = 38; 63.3%), while 22 (36.7%) held a diploma/A1 qualification. Nurses represented the largest occupational group (n = 31; 51.7%), followed by midwives (n = 22; 36.7%) and doctors or allied health professionals (n = 7; 11.7%). Regarding parity, 32 participants (53.3%) had one or two children, and 28 (46.7%) had three or more. Most participants (n = 49; 81.7%) took three months or more of maternity leave, while 11 (18.3%) took less than three months. Half of the participants (n = 30; 50.0%) were using public transport to reach work, and 28 (46.7%) reported a commute time exceeding one hour (Table 1 provides further information social demographics of the study participants).

Table 1
Sociodemographic characteristics of participants (N = 60)

Characteristic	Frequency (n)	Percent (%)
Age (years)		
25–34	29	48.3
35–44	31	51.7
Education level		
Diploma/A1	22	36.7
Bachelor's or higher	38	63.3
Occupation		
Nurse	31	51.6
Midwife	22	36.7
Doctor/Allied health	7	11.7
Number of children		
1–2 child(ren)	32	53.3
≥3 children	28	46.7
Maternity leave duration		
<3 months	11	18.3
≥3 months	49	81.7
Commute time to work		
≤1 hour	32	53.3
>1 hour	28	46.7
Transport mode		
By foot	2	3.3
Motorcycle	13	21.7
Private car	15	25.0
Public transport	30	50.0
Total	**60**	**100**

Exclusive Breastfeeding Practices Among Healthcare Providers

All participants (n = 60; 100.0%) reported that their infants remained at home during working hours. Regarding feeding methods for 6-month-old infants, 51 participants (85.0%) practiced mixed feeding (breast milk and formula), 8 (13.3%) used expressed breast milk, and 1 (1.7%) practiced continuous breastfeeding. Based on the recommended six-month duration, 7 participants (11.7%) achieved exclusive breastfeeding (EBF), while 53 (88.3%) did not. During working hours, 38 participants (63.3%) did not feed or express milk at all, 13 (21.7%) expressed once per day, and 9 (15.0%) expressed two or more times per day. Among those who did not practice EBF (n = 53), the primary reasons cited were perceived insufficient milk production (n = 22; 41.5%) and the time-intensive nature of milk expression (n = 20; 37.7%). Other reasons included breast pain (n = 5; 9.4%), preference for formula (n = 3; 5.7%), and infant refusal to breastfeed (n = 2; 3.8%). Further information is found in Table 2.

Table 2
Breastfeeding practices among healthcare provider mothers (N = 60)

Variable	n	%
Breastfeeding arrangement at work		
Baby stays at home	60	100.0
Feeding method used for a 6-month-old child		
Continuous breastfeeding	1	1.7
Expressing breast milk	8	13.3
Mixed feeding (breast milk + formula)	51	85.0
Exclusive breastfeeding status (EBF)*		
No EBF	53	88.3
EBF	7	11.7
Frequency of feeding/expressing during work hours		
Not at all	38	63.3
Once a day	13	21.7
Two or more times a day	9	15.0
Reasons for not doing exclusive breastfeeding (n = 53)		
Milk production not sufficient for the baby	22	41.5
Pain in the breast area when breastfeeding	5	9.4
More confident/comfortable giving formula milk	3	5.7
Failed to express milk because it demands consistency/time	20	37.7
Baby does not want to breastfeed	2	3.8
None of the above	1	1.9

*Note: EBF variable is based on self-report about whether they fed their babies only with breast milk for the first 6 months of the baby's age.

Knowledge of EBF and Breastmilk Expression

Knowledge of EBF benefits was high across the sample: 60 participants (100.0%) identified that EBF supports healthy growth, 59 (98.3%) noted it enhances immunity, 54 (90.0%) recognized it reduces infection risk, and 52 (86.7%) acknowledged it promotes maternal health. Regarding the primary value of breastfeeding, 20 participants (33.3%) cited infant health, 20 (33.3%) cited nutritional benefits, 15 (25.0%) cited bonding, and 5 (8.3%) cited cost-effectiveness. While 50 participants (83.3%) believed

expressing milk was necessary, only 25 (41.7%) reported receiving formal EBF education. Regarding storage, 43 participants (71.7%) used refrigerators, 23 (38.3%) used room air, and 14 (23.3%) used cooler bags. Knowledge of safe storage durations varied: 38 (63.3%) correctly identified room air limits (4 hours), 27 (45.0%) identified refrigerator limits (4 days), and 17 (28.3%) identified freezer limits (6–12 months). Table 3 provides further information.

Table 3
Knowledge related to exclusive breastfeeding and expressed breast milk storage (N = 60)

Variables	n	%
Received information/education about EBF		
Yes	25	41.7
No	35	58.3
Safe storage method used (Yes)		
Refrigerator	43	71.7
Cooler bag with ice packs	14	23.3
Room air	23	38.3
Storage duration knowledge/practice (Yes)		
Room air up to 4 hours	38	63.3
Refrigerator up to 4 days	27	45.0
Freezer about 6–12 months	17	28.3
Perceived benefits of EBF (Yes)		
Reduces risk of infections	54	90.0
Supports healthy growth and development	60	100.0
Enhances immunity	59	98.3
Promotes maternal health	52	86.7
Value of breastfeeding (single best response)		
Essential for baby's health	20	33.3
Important for bonding	15	25.0
Provides nutritional benefits	20	33.3
Convenient and cost-effective	5	8.3
Is it necessary to give the child expressed breast milk?		
Yes	50	83.3
No	10	16.7
Interested in participating in a workplace breastfeeding program		
Note: Items were asked as separate yes/no responses; percentages represent the proportion answering 'Yes'.		

Variables	n	%
Received information/education about EBF		
Yes	59	98.3
No	1	1.7
Note: Items were asked as separate yes/no responses; percentages represent the proportion answering 'Yes'.		

Perceived Barriers and Facilitators to Maintaining Exclusive Breastfeeding

Work-Related Barriers and Perceived Support: The most frequently reported primary barrier to EBF was lack of time (n = 33; 55.0%), followed by lack of support from colleagues or supervisors (n = 13; 21.7%). Other barriers included inadequate facilities (n = 5; 8.3%), workload demands (n = 3; 5.0%), physical exhaustion (n = 3; 5.0%), and long commute distances (n = 2; 3.3%). Perceptions of employer support were divided: 22 participants (36.7%) viewed their employer as very supportive, 22 (36.7%) as neutral, and 16 (26.7%) as unsupportive. Regarding colleague support, 31 participants (51.7%) reported it was inadequate, while 29 (48.3%) reported it was adequate.

Suggested Supports and Policy Environment

Participants identified several measures to support EBF upon returning to work, including flexible work hours (n = 28; 46.7%), additional breaks for expression (n = 16; 26.7%), designated lactation rooms (n = 10; 16.7%), and support groups (n = 5; 8.3%). Regarding institutional framework, 39 participants (65.0%) reported that their hospital lacked policies supportive of EBF, while 21 (35.0%) reported such policies were in place. Almost all participants (n = 59; 98.3%) expressed interest in participating in a workplace breastfeeding program (Table 4).

Table 4
Perceived barriers and facilitators to maintaining exclusive breastfeeding (N = 60)

Barrier/Facilitator	n	%
Work-related barriers to maintaining exclusive breastfeeding		
Lack of time	33	55.0
Inadequate facilities for expressing/storing milk	5	8.3
Workload and job demands	3	5.0
Lack of support from colleagues/supervisors	13	21.7
Physical exhaustion	3	5.0
Live very far from workplace	2	3.3
Other	1	1.7
Perceived workplace support for breastfeeding		
Employer support for breastfeeding needs		
Very supportive	22	36.7
Neutral	22	36.7
Unsupportive	16	26.7
Adequate colleague support		
Yes	29	48.3
No	31	51.7
Suggested workplace supports and policy environment		
Support that would help maintain EBF upon return to work		
Flexible work hours	28	46.7
Designated breastfeeding/expressing room	10	16.7
Additional breaks for breastfeeding/expressing	16	26.7
Support groups or counselling	5	8.3
Other	1	1.7
Current hospital policies supportive of EBF		
Yes	21	35.0
No	39	65.0

Association between participants’ characteristics and 6 moths exclusive breastfeeding

Bivariable analysis identified several factors significantly associated with EBF status (Table 5). Among sociodemographic characteristics, EBF was more prevalent among participants aged 35–44 years (22.6% vs. 0.0%; P = 0.011), those holding a bachelor's degree or higher (18.4% vs. 0.0%; P = 0.040), midwives and doctors compared with nurses (22.7% and 28.6% vs. 0.0%; P = 0.006), and those with three or more children (25.0% vs. 0.0%; P = 0.003). A commute time exceeding one hour was also significantly associated with EBF (25.0% vs. 0.0%; P = 0.003). Regarding workplace support, inadequate colleague support (P = 0.011) and a neutral employer stance (P = 0.001) were significantly associated with EBF status, while hospital policy support did not reach significance (P = 0.085). Maternity leave duration and frequency of milk expression at work were not significantly associated with EBF practice. These findings should be interpreted cautiously given the small number of participants who achieved EBF (n = 7; 11.7%), which limits the statistical power of subgroup comparisons. Table 5 provides further details.

Table 5
Association between participants' characteristics and practicing 6 moths exclusive breastfeeding

Variable	No EBF n (%)	EBF n (%)	N	P value*
Sociodemographic Characteristics				
Age				
25–34 years	29 (100.0)	0 (0.0)	29	**0.011**
35–44 years	24 (77.4)	7 (22.6)	31	
Education level				
Diploma/A1	22 (100.0)	0 (0.0)	22	**0.04**
Bachelor's or higher	31 (81.6)	7 (18.4)	38	
Occupation				
Nurse	31 (100.0)	0 (0.0)	31	**0.006**
Midwife	17 (77.3)	5 (22.7)	22	
Doctor/Allied health	5 (71.4)	2 (28.6)	7	
Number of children				
1–2 children	32 (100.0)	0 (0.0)	32	**0.003**
≥ 3 children	21 (75.0)	7 (25.0)	28	
Maternity leave duration				
< 3 months	11 (100.0)	0 (0.0)	11	0.33
≥ 3 months	42 (85.7)	7 (14.3)	49	
Commute time to work				
≤ 1 hour	32 (100.0)	0 (0.0)	32	**0.003**
> 1 hour	21 (75.0)	7 (25.0)	28	
Transport mode				
By foot	2 (100.0)	0 (0.0)	2	0.05
Motorcycle	13 (100.0)	0 (0.0)	13	
Private car	15 (100.0)	0 (0.0)	15	
Public transport	23 (76.7)	7 (23.3)	30	
Breastfeeding Practices				

Variable	No EBF n (%)	EBF n (%)	N	P value*
Sociodemographic Characteristics				
Frequency of expression/feeding at work				
Not at all	31 (81.6)	7 (18.4)	38	0.147
Once a day	13 (100.0)	0 (0.0)	13	
≥ 2 times a day	9 (100.0)	0 (0.0)	9	
Knowledge				
Received EBF information/education				
Yes	25 (100.0)	0 (0.0)	25	**0.035**
No	28 (80.0)	7 (20.0)	35	
Uses refrigerator to store expressed milk				
Yes	43 (100.0)	0 (0.0)	43	**< 0.001**
No	10 (58.8)	7 (41.2)	17	
Uses cooler bag with ice packs				
Yes	14 (100.0)	0 (0.0)	14	0.184
No	39 (84.8)	7 (15.2)	46	
Uses room air for storage				
Yes	23 (100.0)	0 (0.0)	23	**0.037**
No	30 (81.1)	7 (18.9)	37	
Knows room-air storage limit (up to 4 hours)				
Yes	38 (100.0)	0 (0.0)	38	**< 0.001**
No	15 (68.2)	7 (31.8)	22	
Knows refrigerator storage limit (up to 4 days)				
Yes	27 (100.0)	0 (0.0)	27	**0.013**
No	26 (78.8)	7 (21.2)	33	
Knows freezer storage limit (about 6–12 months)				
Yes	17 (100.0)	0 (0.0)	17	0.175
No	36 (83.7)	7 (16.3)	43	
EBF reduces risk of infections				

Variable	No EBF n (%)	EBF n (%)	N	P value*
Sociodemographic Characteristics				
Yes	52 (96.3)	2 (3.7)	54	**< 0.001**
No	1 (16.7)	5 (83.3)	6	
EBF promotes maternal health				
Yes	52 (100.0)	0 (0.0)	52	**< 0.001**
No	1 (12.5)	7 (87.5)	8	
Expressed breast milk is necessary				
Yes	50 (100.0)	0 (0.0)	50	**< 0.001**
No	3 (30.0)	7 (70.0)	10	
Workplace Barriers and Support				
Adequate colleague support				
Yes	29 (100.0)	0 (0.0)	29	**0.011**
No	24 (77.4)	7 (22.6)	31	
Employer support for breastfeeding needs				
Very supportive	22 (100.0)	0 (0.0)	22	**0.001**
Neutral	15 (68.2)	7 (31.8)	22	
Unsupportive	16 (100.0)	0 (0.0)	16	
Hospital policies supportive of EBF				
Yes	21 (100.0)	0 (0.0)	21	0.085
No	32 (82.1)	7 (17.9)	39	
Total				
* P values derived from Fisher's exact test				

Discussion

This hospital-based cross-sectional study among healthcare provider mothers in Kigali revealed a pronounced gap between knowledge of exclusive breastfeeding (EBF) and actual EBF and milk expression practices. Despite high awareness of EBF benefits and strong interest in workplace breastfeeding support, only a small proportion achieved the recommended six months of EBF, and most were unable to express milk during working hours. These findings are consistent with evidence from

other low- and middle-income settings showing that knowledge alone is insufficient to sustain EBF when work and system-level constraints are substantial.

Knowledge–Practice Gap in Exclusive Breastfeeding

Only 11.7% of healthcare provider mothers in this study maintained EBF for six months, despite almost universal recognition that EBF supports healthy growth, enhances immunity, and reduces infection risk. This pattern aligns with previous work demonstrating low EBF prevalence among healthcare workers in various contexts: for example, a cross-sectional study among nurses and midwives in northern Ghana reported an EBF rate of 53.1%(5), whereas studies in Nigeria documented rates as low as 3% (14) in some tertiary settings. Compared with these figures, the 11.7% EBF prevalence observed here lies at the lower end of the range reported in the literature and remains clearly below global and WHO targets, which call for increasing exclusive breastfeeding in the first six months of life to at least 50% by 2025(15) and 60% by 2030(16).

The persistence of suboptimal EBF practices among healthcare providers is particularly notable because these individuals typically have greater exposure to breastfeeding guidelines and training than the general population. In this study, almost all respondents recognized EBF's benefits for infant and maternal health, and more than four-fifths believed that expressed breast milk was necessary, echoing findings from other settings where healthcare workers showed strong theoretical support for EBF but struggled to practice it consistently(4).The findings suggest that workplace conditions may influence EBF practices more strongly than knowledge alone.

At the same time, slightly more than half of participants in this study reported never having received formal education specifically on EBF, despite working in clinical environments. This contrasts with studies from higher-resource or Baby-Friendly Hospital Initiative (BFHI)–aligned settings(13), where structured breastfeeding training is more routinely embedded in pre-service and in-service curricula. The combination of high general awareness but limited formal training suggests that much of the knowledge in the current sample is implicit or experiential rather than acquired through systematic capacity-building, with potential implications for the quality and consistency of breastfeeding counseling that providers themselves offer to patients.

Bivariable analysis further reinforced this gap: EBF was significantly more common among older participants (35–44 years), those with higher educational qualifications, and those with three or more children ($P < 0.05$), suggesting that experience and accumulated confidence over successive pregnancies may partly buffer the effect of structural constraints. Paradoxically, participants who had not received formal EBF education were more likely to report EBF than those who had, which may indicate that those who achieved EBF relied on direct breastfeeding rather than expressing and storing milk, thus requiring less formal knowledge of expression techniques. These associations should be interpreted cautiously given the small number of EBF participants (n = 7; 11.7%).

Work-Related Constraints and Milk Expression Practices

Workplace conditions emerged as a central barrier to maintaining EBF and regular milk expression. All healthcare provider mothers reported that their infants stayed at home while they were at work, and 63.3% did not feed or express milk at all during working hours. The most frequently cited barrier to maintaining EBF was lack of time, followed by insufficient support from colleagues and supervisors and inadequate facilities for expressing or storing milk. These findings closely mirrored reports from studies in other hospital settings, where long shifts, unpredictable workloads, and rigid schedules made it difficult for healthcare workers to schedule breast milk expression(9).

Among non-EBF mothers in this study, 37.7% indicated that they failed to express milk because it demanded consistency and time, and 41.5% perceived their milk production as insufficient. This pattern reflects a common finding in the literature where perceived low milk supply and difficulties with expressing are intertwined with work demands and stress(7). Limited opportunities to express and store milk at work likely exacerbated concerns about supply and reinforced decisions to introduce formula early, thereby reducing the likelihood of sustaining EBF.

Compared with facilities in higher-income settings or strongly BFHI-implemented hospitals, the participating hospitals in Kigali appeared to offer fewer structural supports for milk expression, such as dedicated lactation rooms, formalized pumping breaks, or readily available storage equipment (8). Although a substantial proportion of participants knew about refrigerator and freezer storage times, fewer than half correctly identified recommended storage durations for refrigerated milk, and less than one-third knew how long milk could be safely stored in a freezer(17, 18). This partial knowledge, combined with infrastructural limitations, reduced the feasibility of using expressed milk as a practical strategy for maintaining EBF while working(8).

Bivariable findings add nuance to these constraints: occupation was significantly associated with EBF status ($P = 0.006$), with midwives and doctors more likely to report EBF than nurses, which may reflect greater flexibility over time during shifts among non-nursing cadres. Commute time exceeding one hour was also associated with EBF ($P = 0.003$), while frequency of milk expression at work was not statistically significant ($P = 0.147$), suggesting that those who achieved EBF may have done so through sustained direct breastfeeding rather than workplace expression.

Workplace Culture, Social Support, and Institutional Policies

Beyond individual time and workload constraints, the study highlighted the importance of workplace culture and policy. More than a quarter of participants perceived their employer as unsupportive of breastfeeding needs, and just over half reported inadequate colleague support. These findings were consistent with evidence from other hospital workplace settings, where social norms and workplace attitudes may not have favored breastfeeding or expressing at work, even when general awareness of EBF benefits was high(9).

A key finding in this study was the limited presence of explicit institutional support: 65.0% of participants reported that their hospital did not have policies supportive of EBF. This aligned with studies demonstrating that written policies, when implemented, could help normalize lactation breaks, legitimize the need for private space, and protect mothers from perceived or actual stigma when they took time to express milk(8). The association between EBF-supportive policy and higher EBF practice was in line with evidence from BFHI and other workplace-based initiatives(13), which showed that formal policies and management commitment could improve breastfeeding outcomes among both staff and patients.

In the Rwandan context, this finding was particularly noteworthy. Rwanda had been recognized globally for its relatively high national EBF rates, reported at approximately 81% among the general population(10), and Rwanda recently extended maternity leave to 14 weeks(11), and UNICEF Rwanda had called on both public and private sectors to invest in breastfeeding spaces, paid breastfeeding breaks, and extended parental leave. However, the present findings suggested a critical implementation gap: despite these national-level provisions, facility-level policies and day-to-day practices in the participating hospitals did not consistently reflect or enforce these entitlements. This disconnection between national policy and institutional practice represents a key area for targeted intervention.

Bivariable analysis revealed that inadequate colleague support (P = 0.011) and a neutral employer stance (P = 0.001) were significantly associated with EBF, whereas perceived hospital policy support did not reach significance (P = 0.085). This pattern suggests that formal institutional policies, while important, may not translate into sustained EBF practice unless accompanied by consistent collegial support and a workplace culture that actively normalizes breastfeeding. The finding that a neutral rather than supportive employer stance was associated with EBF may indicate that in the absence of institutional pressure, motivated individuals found ways to maintain breastfeeding on their own terms.

Implications for Healthcare Providers and the Health System in Rwanda

The knowledge–practice gap documented in this study had implications beyond the personal health of provider mothers and their infants. Healthcare workers were key agents of change in promoting EBF in the community, and their own experiences and practices may have influenced the credibility, consistency, and persuasiveness of the counseling they provided. When providers were unable to practice EBF themselves, despite recognizing its benefits, this may have undermined their confidence or created dissonance between recommendations and lived experience.

The present findings suggested that addressing EBF among healthcare providers in Rwanda required a shift from focusing primarily on individual-level knowledge to targeting structural and organizational determinants. In particular, flexible work scheduling, protected time for expression, designated lactation spaces, and clear breastfeeding-supportive policies may have been critical for narrowing the knowledge–practice gap. These facility-level interventions would complement, but not replace, ongoing education on breastfeeding techniques and storage practices. As UNICEF Rwanda had emphasized,

investment in breastfeeding-friendly workplaces was not only a health imperative but also a social and economic one(2, 11), with benefits extending to both mothers and their infants.

At the national and institutional levels, the findings supported integration of staff-focused breastfeeding support into broader maternal and child health strategies. As Rwanda continued to strengthen its health system and expand coverage of maternal and newborn services, ensuring that healthcare facilities modeled breastfeeding-friendly environments for their own staff may have enhanced both provider wellbeing and the quality of care delivered to patients.

Taken together, the descriptive and bivariable findings suggest that interventions targeting EBF among healthcare providers should move beyond knowledge dissemination to address occupational and interpersonal determinants, including cadre-specific scheduling accommodations and peer support mechanisms. Maternity leave duration alone was not significantly associated with EBF (P = 0.330), reinforcing that policy provisions must be accompanied by facility-level implementation, cultural reinforcement, and protected time for expression to meaningfully improve breastfeeding outcomes among healthcare staff.

Strengths and Limitations of the study

Compared with existing studies, the current work added context-specific evidence from an urban Rwandan hospital setting and focused specifically on healthcare provider mothers, a group that was often underrepresented in breastfeeding research. The study's use of a structured, previously validated questionnaire and its comprehensive assessment of both knowledge and practice strengthened its contribution.

However, like similar cross-sectional studies, the findings were subject to several limitations. The sample size was relatively small and confined to three hospitals in Kigali, which may have limited generalizability to rural facilities or private sector institutions. Self-reported breastfeeding and expression practices may also have been influenced by recall and social desirability bias, particularly among health professionals. In addition, the study did not directly measure all potential determinants of EBF, such as detailed shift patterns, staffing ratios, or the extent of policy implementation at ward level, which had been explored more extensively in some other settings. Despite these limitations, the results were consistent with a growing body of evidence indicating that for healthcare providers, the primary barriers to EBF were structural rather than informational, underscoring the need for system-level responses aligned with global best practices but tailored to local resource constraints and service delivery realities.

Conclusions

This study documented a marked gap between knowledge of exclusive breastfeeding and reported breastfeeding practice among healthcare providers in three public hospitals in Kigali, with only 11.7% of participants maintaining EBF for the first six months despite near-universal awareness of its benefits. Workplace constraints, particularly lack of time, inadequate facilities, and insufficient collegial support,

were the most prominent barriers, while bivariable analysis identified older age, higher educational attainment, midwifery or medical occupation, and higher parity as factors associated with EBF status. Maternity leave duration and perceived hospital policy support were not significantly associated with EBF outcomes, suggesting that formal provisions alone may be insufficient without corresponding improvements in day-to-day workplace conditions. These findings point to the need for facility-level strategies that combine protected time for expression, appropriate infrastructure, and a supportive workplace culture, and underscore the value of future research with larger samples to confirm these associations and guide evidence-based interventions.

Declarations

Ethics Approval and Consent to Participate

This study was approved by the College of Medicine and Health Sciences Institutional Review Board of the University of Rwanda (CMHS/IRB/683/2024) and by the ethics committees of the three participating hospitals. Written informed consent was obtained from all participants prior to data collection. Confidentiality was maintained by anonymizing all data and excluding direct identifiers throughout the study process.

Consent for Publication

Not applicable.

Competing Interests

The authors declared that they had no competing interests.

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Author Contribution

ZI, JM, NR, MC, ABAH, and UP conceived and drafted the study proposal. ZI led data collection. ZI and ZN designed the study, conducted the analysis, and drafted the first version of the manuscript. JM, NR, MC, ABAH, and UP contributed to refinement of the study design, interpretation of the findings, and critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript.

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Data Availability

The dataset and Stata version 17.0 do file are available from the corresponding author upon reasonable request.

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