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Factors associated with successful exclusive breastfeeding among mothers in the formal sector: a mixed-method study in Kampala, Uganda

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Abstract

Background Globally, evidence shows that exclusive breastfeeding (EBF) for the first six months of an infant's life has health benefits for families, communities, and the nation. However, many employed women discontinue EBF before six months, while others succeed. This study aims to identify and explain the factors that enable EBF success among employed mothers in the formal sector.

Methods The study employed a sequential explanatory mixed-methods design. Quantitative phase used questionnaires administered to collect EBF data from 224 mothers with children 6–18 months. EBF was measured as self-reported by a mother who EBF her current infant/child for six months. Data was analyzed to guide the case study, where key-informant interviews were used to collect data from 10 mothers. Both phases lasted from November 2021 to February 2022. Multivariable logistic regression analysis of quantitative data established associated factors with EBF. Qualitative data was coded, grouped, and categorized to generate themes explaining EBF success.

Results The majority (76.3%) of mothers were ≥ 25 years. Their mean age was 27.3 ± 3.65 years. Most (66%) were married. 87.4% had 3 ≥ months of maternity leave. Overall EBF prevalence at six months was 31.7%. Significant factors were: Bachelor's degree (AOR = 3.04; 95% CI. 1.04, 8.86), Financial support (AOR = 6.62; 95% CI. 2.27, 19.31), domestic support (AOR = 5.23; 95% CI. 1.88, 14.52), psychological support (AOR = 5.45; 95% CI. 1.47, 20.20), and workmate support (AOR = 2.95; 95% CI. 1.54, 5.67). Prelacteal feeding (AOR = 0.16; 95% CI, 0.06, 0.45). More than four ANCs (AOR = 0.18: 95% CI. 0.04, 0.82). The qualitative phase generated five themes, these were: *context*, *social support system*, *breastfeeding-friendly hospitals and workplace*, *and maternal EBF mindset*. These themes fit theory-relevant concepts: social cognition and institutional factors, individual cognition, and EBF behavior. These concepts align with Social Cognitive theory.

Conclusion A third of the mothers had EBF. Significant factors for EBF included, bachelor's degree, supportive environments at family, healthcare, and workplace, and a woman's mindset. This implies mothers, practitioners, managers, and policy-makers to optimize EBF rates among employed Ugandan working women, they need to

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integrate supportive environments at family, create breastfeeding-friendly environments, and empower women to a breastfeeding mindset.

Keywords Successful exclusive breastfeeding, Employed mothers, Formal sector, Breastfeeding-friendly workplaces, Social support systems, Maternal mindset

Background

Despite the many benefits of exclusive breastfeeding (EBF) for the first six months of an infant's life for the mother–infant pair, families, communities, and nation [1–3], most employed women discontinue EBF [4–6]. A cross-sectional study conducted in Ethiopia showed that employed women had a (75.7%) prevalence of EBF cessation. with workplace factors such as short maternity leave, lack of breastfeeding breaks, among others being significantly associated [7]. Similarly, the prevalence associated with EBF among mothers employed in the informal sector in Kampala, Uganda, was 42.8% at six months [8], which was lower compared to the nation's prevalence of 65% at six months [9]. This rate was similar to another study conducted among employed mothers in health facilities of Lira District, Uganda of 43.9% at six months [10]. The EBF prevalence among working mothers, both in formal and informal sectors, from these two studies is below the WHO 2025 target of 50% [10]. Thus, maternal employment predicts EBF success for the first six months [11, 12].

Many mothers struggle to balance EBF and work [13]. For example, long hours of separation from infants [14, 15], the workplace stress [16], inadequate family–workplace support, lack of maternity leave, breastfeeding policies and practices converge for employed mothers to stop EBF in most countries [2]. Importantly, many employed mothers adapt creative strategies to successful EBF. For example, many use paternal or family support, their mindset to succeed in EBF [17, 18]. Thus, this study seeks to determine the factors associated with successful EBF among mothers employed in the formal sector.

Methods

Study design, area, population, and inclusion criteria

A mixed-method sequential explanatory design was employed [19]. First, data for the quantitative component were collected and analysed. The findings were used to guide the collection and analysis of the qualitative data to explain the quantitative results and relationships. The study area was Kampala, the Capital City of Uganda, with five (5) administrative divisions: Central, Kawempe, Rubaga, Makindye, and Nakawa [20] with an approximate population of 1,507,080 people. Approximately 110,750 persons work in the formal sector in the city; Uganda has 77% private services and 23% public services [21]. The point of data collection was the selected hospitals in Kampala Capital City, and these were: Mulago Specialized National Referral Hospital, St. Francis, Nsambya Hospital, Uganda Martyrs Hospital, and Rubaga, Mengo Hospital. The city has the best and busiest hospitals, such as Mulago Specialized National Referral Hospital, which delivers over 39,000 births/year [22], and St. Francis Nsambya Hospital, which delivers 6000 babies/year [23]. To participate in this study, the participant (mother-child pair) had to be working in the formal sector and her infant had to be between 6 and 18 months of age; the mother must have consented to participate in the study.

Sample size determination and sampling technique

Sample size determination

The study unit and unit of analysis were mother–child pairs at the immunization and/or paediatric outpatient department clinic. The sample size was determined via a single population proportion formula with a confidence interval of 95% and a 5% margin of error by taking the prevalence of EBF at 15.8% from a study conducted among formally employed mothers in Naivasha, Kenya [24].

Thus, a formula developed by Kish Leslie (1965) was used.

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n Sample size, **Z** = Value of the given confidence interval, **P** = Population proportion (prevalence of the outcome of interest), **q** = 1- P, **d** = Margin of error.

The sample size was calculated as follows:

Given: n=?

Z = 1.96

P = 15.8% = 0.158

q = 1-0.158 = 0.842

d = 0.05

Therefore, $n = \frac{Z^2 pq}{d^2}$ N = 204.4.

Thus, given a sample size of N = 204 participants and a 10% nonresponse rate, the sample size for the study was **224** participants. This sample size was for the quantitative component.

The sample size for the qualitative component was ten (10) mothers purposively selected as key informants from the 224 that participated in the quantitative component.

Sampling technique

In this study, for the quantitative component, the first step was to screen participants (mother-child pairs); second step we used a simple random sampling on the participants. We consecutively sampled every third (3rd) mother–child pair at the immunization services and/or outpatient department paediatric care in the selected hospitals who met the inclusion criteria for study enrolment.

For the qualitative component, the cases were selected based on their responses in the quantitative component. These in-depth interviews explained the findings and relationships of the quantitative phase.

Data collection instruments and procedures

Quantitative data

The questionnaires were pretested; necessary considerations and/or adjustments were made before the actual data collection. Staff from the selected hospitals who worked at the immunization clinic and outpatient paediatric clinic were recruited as Research Assistants (RAs) to collect data from the participants. We trained RAs on how to obtain informed consent, confidentiality, and proper data handling during the data collection exercise. During data collection, first, the RA obtained informed consent from each participant who met the inclusion criteria; questionnaires written in English were used to collect the data from the participants for a period of 12 weeks. Each interview lasted about 15 to 30 min. The principal investigator (PI) supervised the data collection, checking for completeness of questionnaires and observance of ethical guidelines.

Qualitative data collection

A multiple case study approach was used. We conducted in-depth interviews with 10 key informants to explore the quantitative findings. Participants were purposively selected basing on their responses to the questions that assessed breastfeeding initiation and EBF duration in the quantitative phase. Thus participants who stated to have initiated breastfeeding after birth and/or practiced EBF and who consented to participate were given a form to fill in their details. The PI used online communication platforms such as Zoom and Google Meet, and phone calls as preferred by the individual participant to conduct in-depth interviews. The interviews followed a semi-structured guide lasting about 30–45 min. The PI recorded the interviews, checked for data completeness during collection, and data entry accuracy.

Data analysis

Quantitative data

The collected data were coded before being entered into Epi Data Info version 7. Data was cleaned then exported to the Statistical Package for the Social Sciences (SPSS) for analysis. Descriptive statistics such as frequencies, proportions, and measures of central tendency and measures of variation were used to describe the distributions of the variables.

The logistic regression model was used to test for the strength of the association between the dependent variable and the independent variables. The dependent variable was a mother who had exclusively breastfed for the first six months. The independent variables were maternal and child demographic factors, workplace factors, antenatal practices, social support and others. The variables with $p < 0.2$ in the unadjusted binary logistic regression analysis were entered into the multivariable logistic regression (adjusted analysis) to control for confounders. A backwards elimination technique was used to remove variables from the model. Upon generation of outputs, the adjusted odds ratios with 95% confidence intervals were recorded, and variables with a p-≤ 0.05 were considered to be significantly associated with exclusive breastfeeding.

Qualitative data

The qualitative data analysis ATLAS Ti version 5.21.2 to code, develop core categories and generated themes. The themes were refined to abstract theory-relevant concepts explaining the key quantitative findings of the study. The supervisor, conversant with qualitative data, reviewed the audios, quotes, and explanations.

Results

Descriptive results for quantitative component

The study enrolled 224 mothers working in the formal sector. They had infants/children aged between 6 and 18 months. The mean age of participants was 27.3 ± 3.65 years (SD). More than three-quarters (76.3%) of the mothers were 25 years and above. Most (66.1%) were married and stayed with their husbands. More than half (54.9%) of the babies were 6–9 months old. Only a quarter of the mothers held a bachelor's degree education level.

Nearly half (48.2%) of the mothers were employed in the service sector. They majority (63%) earned at least 144 USD. The majority (95.5%) of the mothers had three months of paid maternity leave. More than a quarter (28.6%) of mothers received support from their supervisors, and 34% received support from their workmates. Three-quarters (75%) of the mothers had received various support from close family. More than half (60%) of participants had attended at least four antenatal visits. Most (80%) deliveries were normal, and term births (91%). The majority (85.7%) initiated breastfeeding within an hour of birth. Only 31.7% of the participants practiced EBF at six months (Table 1).

Table 1 Shows participants' characteristics ($n = 224$)

Variable	Frequency (*n*)	Percentage (%)
Age group		
19–24 years	53	23.7
≥ 25 years	171	76.3
Marital status		
Single mother	51	22.8
Married, not staying with husband	25	11.2
Married, staying with husband	148	66.1
Education level		
College Certificate	82	36.6
Diploma	88	39.3
Bachelor's Degree	54	24.1
Religious affiliation		
Born again	27	12.1
Catholic	112	50.0
Muslim	37	16.5
Protestant	48	21.4
Ethnic groups		
Bantu	195	87.1
Non-Bantu	29	12.9
Residence distance away from the workplace		
0-5kms	191	85.3
6 and above	33	14.7
Occupation sector		
Business enterprises and the tourism sector	98	43.8
Security and legal sector	18	8.0
Service sectors (Healthcare and education)	108	48.2
Have an extra paid job.		
No	197	87.9
Yes	27	12.1
Salary		
100,000-400,000	83	37.1
500,000 and above	141	62.7
Family support for EBF		
No	57	25.4
Yes	167	74.6
Type of support from family		
Bought food	101	60.5
Financial support	22	13.2
Domestic chores	26	15.6
Psychosocial	18	10.8
Type of employer		
Private sector	97	43.3
Government (Public sector)	127	56.7
Employment contract		
Full-time	214	95.5
Part-time	10	4.5
Mother has been given paid maternity leave.		
No	18	8.0
Yes	206	92.0
Duration of paid maternity leave		
1 Month	7	3.4
2 Months	19	9.2
3 Months	174	84.5
4 and above	6	2.9
Had taken an unpaid maternity leave		
No	6	33.3
Yes	12	66.7
How long is the unpaid maternity leave?		
1 month	8	66.7
2 months	4	33.3
Breastfeeding services at the workplace.		
Breastfeeding corner	11	5.3
Breast milk storage facility	11	5.3
Task adjustment	65	31.6
Breastfeeding break	18	8.7
None	101	49.0
Got support from the manager/supervisor		
No	160	71.4
Yes	64	28.6
Got support from workmates		
No	148	66.1
Yes	76	33.9
Number of ANC visits (where EBD information is given)		
< 4 visits	12	5.4
4 Visits	135	60.3
> 4 Visits	77	34.4
Mode of delivery		
Caesarean section	44	19.6
Normal delivery	180	80.4
Pregnancy duration (months)		
Six	1	0.4
Seven	8	3.6
Eight	12	5.4
Nine	203	90.6
Baby given anything other than Breast milk at birth		
No	185	82.6
Yes	39	17.4
Time taken to initiate BF at birth		
≤ 60 min (Within an hour)	192	85.7
> 60 min	32	14.3
Duration in Months of Exclusive Breastfeeding		
Two (2) months	15	6.7
3	113	50.4
4	14	6.3
5	11	4.9
6≥	71	31.7
Age of children (months)		
6–9	123	54.9
10–12	42	18.8
13–15	45	20.1

Table 1 (continued)

Variable	Frequency (*n*)	Percentage (%)
16–18	14	6.3
Baby admitted to the Intensive Care Unit (ICU)		
No	193	86.2
Yes	31	13.8

Factors associated with exclusive breastfeeding success among mothers in the formal sector (Bivariate analysis)

Sociodemographic and economic factors

Several factors were associated with EBF. Mothers with bachelor's degree (OR = 2.28; 95% CI. 1.12, 4.64), married mothers (OR = 12; 95% CI. 3.07, 51.42), received financial (OR = 8.12; 95% CI. 2.93, 22.56), domestic (chores) support (OR = 5.80; 95% CI. 2.21, 15.25), psychological care (OR = 6.77; 95% CI. 2.27, 20.18) from close family members significantly predicted EBF success. However, maternal age, distance between residence and workplace, occupation, and monthly salary were not significantly associated with EBF success among mothers in the formal sector (Table 2).

Maternal workplace factors associated with EBF

This study revealed that mothers in the public sector had significantly lower odds of EBF success, compared to those in the private sector (OR = 0.39; 95% CI. 0.22, 0.69). Conversely, extended maternity leave of three months or more increased the likelihood of EBF success by 2.45 times (OR = 2.45; 95% CI. 0.48, 12.49); while workmates and managers' support showed increased odds of EBF success (OR = 1.86; 95% CI. 1.04, 3.34) and (OR = 1.31; 95% CI. 0.71, 2.42) respectively (Table 3).

Maternal and infant' health factors associated with EBF

Before controlling for cofounders, this study showed that attending four ANC visits was significantly associated with EBF success (OR = 0.29; 95% CI. 0.09, 0.97). Mothers with a parity of three or more had significantly lower odds of EBF (OR = 0.43; 95% CI. 0.22, 0.81). Similarly, giving prelacteal feeds significantly reduced the likelihood of EBF success (OR = 0.27; 95% CI. 0.10, 0.71). Furthermore, before controlling for cofounders, this study showed that mothers who initiated breastfeeding after an hour had higher odds of EBF success (OR = 2.49; 95% CI. 1.17, 5.33). However, there was no statistical significance between mode of delivery, baby age, baby sex, and baby being admitted to the ICU with EBF success (Table 4).

Factors associated with exclusive breastfeeding success among mothers in the formal sector (Multivariate analysis)

This section describes findings from multivariable logistic regression analysis between the independent variables that were significantly associated with higher or lower odds of EBF.

Socio-demographic and economic factors promoting EBF

Maternal education

After controlling for cofounders, our study showed that education level at bachelor's degree was significantly associated with EBF success; mothers who had a bachelor's degree had increased odds of EBF success by 3.04 times more, compared to those with a certificate level of education (AOR = 3.04; 95% CI. 1.04, 8.86). Similarly, mothers who had a Diploma level of education had increased odds of EBF success by 1.25 times more, compared to those with a certificate level of education (AOR = 1.25; 95% CI. 0.45, 3.48).

Forms of close family member(s) support

Our study showed that mothers who received financial support, "tip" *(or "ezo kukameza" in local dialect)* had significantly (6.6 times) higher odds of EBF success compared to those who were given only food (AOR = 6.62; 95% CI. 2.27, 19.31). Similarly, mothers who received domestic support (house chores) had significantly 5.2 times higher odds of EBF success compared to those who received food support, (AOR = 5.23; 95% CI. 1.88, 14.52). Additionally, mothers who received psychological support had significantly 5.5 times higher odds of EBF success compared to those who received food support (AOR = 5.45; 95% CI. 1.47, 20.20).

Maternal healthcare factors

Our study showed that, attending more than four ANC visits was significantly associated with EBF success (AOR = 0.18: 95% CI. 0.04, 0.82).

Workplace factors promoting EBF

Workmates support

This study revealed that mothers who received support from workmates had three times higher odds of EBF success compared to those who did not (AOR = 2.95; 95% CI. 1.54, 5.67).

Infant health factors: EBF

Prelacteal feed

The study revealed that giving prelacteal feed to infants significantly lowered odds of EBF success (AOR = 0.16; 95% CI. 0.06, 0.45), indicating an 84% reduction in the likelihood of EBF success.

Thus, after adjusting for cofounders, there were no significant associations between marital status, employment

Table 2 Bivariate analysis between maternal demographic, socioeconomic factors, and EBF ($n = 224$)

Variable	Exclusive Breastfeeding		Total	Unadjusted Odds Ratio	*P*-Value
	No (%)	Yes (%)		uOR 95% CI	
Participant's age					
19–24 years	42 (79.2)	11 (20.8)	53	1	
25 and above	111 (64.9)	60 (35.1)	171	2.06 (0.99, 4.30)	0.053
Education level					
College certificate *(Post-secondary level).*	57 (69.5)	25 (30.5)	82	1	
Diploma *(Post-secondary but sub-degree level).*	69 (78.4)	19 (21.6)	88	0.63 (0.31, 1.25)	0.187
Bachelor's degree	27 (50.0)	27 (50.0)	54	2.28 (1.12, 4.64)	0.023*
Marital status					
Single	48 (94.1)	3 (5.9)	51	1	
Married, not staying with husband	14 (56.0)	11 (44.0)	25	12.57 (3.07, 51.42)	0.000***
Married, staying with husband	91 (61.5)	57 (38.5)	148	10.02 (2.98, 33.69)	0.000***
Religion					
Born Again	17 (63.0)	10 (37.0)	27	1	
Catholic	79 (70.5)	33 (29.5)	112	0.71 (0.29, 1.71)	0.446
Moslem	26 (70.3)	11 (26.7)	37	0.72 (0.25, 2.06)	0.29
Protestant	31 (64.6)	17 (35.4)	48	0.93 (0.35, 2.48)	0.907
Distance between residence and workplace					
1–5 km	133 (69.6)	58 (30.4)	191	1	
6 Above	20 (60.6)	13 (39.4)	33	1.49 (0.70, 3.20)	0.305
Occupation					
Business enterprises and the tourism sector	64 (65.3)	34 (34.7)	98	1	
Security and legal sector	14 (77.8)	4 (22.2)	18	0.54 (0.16, 1.76)	0.306
Service sector	75 (69.4)	33 (30.6)	108	0.83 (0.46, 1.49)	0.527
Extra paid job					
No	139 (70.6)	58 (29.4)	197	1	
Yes	14 (51.9)	13 (48.1)	27	2.23 (0.99, 5.03)	0.054
Monthly salary (UGX.)					
100,000-400,000	57 (68.7)	26 (31.3)	83	1	
≥ 500,000	96 (68.1)	45 (31.9)	141	1.03 (0.57, 1.84))	0.927
Close family member(s) support in forms of:					
Bought Food	88 (87.1)	13 (12.9)	101	1	
Financial Support	10 (45.5)	12 (54.5)	22	8.12 (2.93, 22.56)	0.000***
Domestic support (chores)	14 (53.8)	12 (46.2)	26	5.80 (2.21, 15.25)	0.000***
Psychological support	9 (50)	9 (50)	18	6.77 (2.27, 20.18)	0.001***

*$p < 0.05$ (Statistically significant at the 5% level); **$p < 0.01$ (Statistically significant at the 1% level); ***$p < 0.001$ (Statistically significant at the 0.1% level)

Definition of close family member support: refers to the emotional, practical, and social assistance provided by immediate family member(s) for instance. husband, sister, or mother during the period of breastfeeding after child birth

Sector, paid maternity leave, parity, and time taken to initiate BF after birth with EBF success among mothers in the formal sector. (Table 5). These findings were explored in the qualitative component.

Qualitative results that explain the quantitative findings and relationships

The qualitative component identified five themes: context, social support systems, breastfeeding-friendly healthcare facilities, breastfeeding-friendly workplaces, and EBF mindset that explained how mothers understood the quantitative findings. In the text below, ***"P#"*** represents participant number who shared her EBF experience during the in-depth interview.

a) Context

Some key informants revealed that in the first trimester, they experienced vomiting, lack of appetite, and general weakness. The second trimester seemed okay. However, during the last trimester, anxiety affects their sleep. Delivery, such as by caesarean section (CS) or premature birth, aggravated physical, emotional, and financial stress for some mothers.

> *Pregnancy is sometimes tiresome. I was hungry but I had nausea. I never wanted to bathe. I used to take sugar cane and water. At six months, I ate a lot. I had a lot of energy. I could run. At seven months, I was worried about how to pay the hospital bills and*

Table 3 Bivariate analysis between maternal workplace factors and EBF ($n = 224$)

Variable	Exclusive Breastfeeding		Total (*n*)	Unadjusted OR 95% CI	*P*-Value
	No (%)	Yes (%)			
Employment sector					
Private	55 (56.7)	42 (43.3)	97	1	
Public Sector (government)	98 (77.2)	29 (22.8)	127	0.39 (0.22, 0.69)	0.001***
Employment contract					
Full-Time	148 (69.2)	66 (30.8)	214	1	
Part-Time	5 (50.0)	5 (50.0)	10	2.24 (0.63, 8.01)	0.214
Months of maternity Leave					
< 3 months	142 (71)	58 (29)	200	1	
≥ 3 Months	3 (50)	3 (50)	6	2.45 (0.48, 12.49)	0.281
Breastfeeding support					
Breastfeeding corner	5 (45.5)	6 (54.50	11	1	
Breastmilk storage facility	11 (84.6)	2 (15.4)	13	0.15 (0.02, 1.03)	0.054
Task adjustment	55 (75.3)	18 (24.7)	73	0.27 (0.07, 1.00)	0.050
Breastfeeding breaks	9 (47.4)	10 (52.6)	19	0.93 (0.21, 4.11)	0.919
None	73 (67.6)	35 (32.4)	108	0.40 (0.11, 1.40)	0.151
Managers' support					
No	112 (70.0)	48 (30.0)	160	1	
Yes	41 (64.1)	23 (35.9)	64	1.31 (0.71, 2.42)	0.389
Workmate support					
No	108 (73.0)	40 (27.0)	148	1	
Yes	45 (60.3)	31 (40.8)	76	1.86 (1.04, 3.34)	0.037*

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 4 Bivariate analysis between maternal healthcare factors, infant factors, and EBF ($n = 224$)

Variable	Exclusive Breastfeeding		Total (*n*)	Unadjusted OR 95% CI	*P*-Value
	No (%)	Yes (%)			
Parity					
1-2parity	91 (62.3)	55 (37.7)	146	1	
≥ 3	62 (79.5)	16 (20.5)	78	0.43 (0.22, 0.81)	0.010*
Number of ANC visits					
< 4 visits	5 (41.7)	7 (58.3)	12	1	
4 visits	96 (71.1)	39 (28.9)	135	0.29 (0.09, 0.97)	0.044*
≥ 4 visits	52 (67.5)	25 (32.5)	77	0.34 (0.10, 1.19)	0.092
Mode of delivery					
Caesarean section	33 (75)	11 (25)	44	1	
Vaginally	120 (66.7)	60 (33.3)	180	1.50 (0.71, 3.17)	0.289
Gave prelacteal feed					
No	119 (64.3)	66 (35.7)	185	1	
Yes	34 (87.2)	5 (12.8)	39	0.2 (0.10, 0.71	0.008**
Time of initiation of BF after birth					
≤ 60 min (Within an hour)	137 (71.4)	55 (28.6)	192	1	
> 60 min	16 (50)	16 (50)	32	2.49 (1.17, 5.33)	0.019*
Baby age range					
6-12months	112 (67.5)	54 (32.5)	166	1	
≥ 12	41 (70.7)	17 (29.3)	58	0.86 (0.45, 1.65)	0.650
Baby sex					
Male	74 (73.3)	27 (26.7)	101	1	
Female	79 (64.2)	44 (35.8)	123	1.53 (0.86, 2.71)	0.153
Baby admitted to the ICU.					
No	134 (69.4)	59 (30.6)	193	1	
Yes	19 (61.3)	12 (38.7)	31	1.43 (0.65, 3.15)	0.368

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 5 Multivariable logistic regression between predictor variables and EBF ($n = 224$)

Variable	Exclusive Breastfeeding		Unadjusted odds ratio (uOR)	Adjusted odds ratio, aOR (95%CI)	*p*-value
	No *n* (%)	Yes *n* (%)			
Marital status					
Single	45 (93.8)	3 (6.3)	1	1	
Married, not staying with husband	13 (59.1)	9 (40.9)	12.57 (3.07, 51.42)	433539225.1 (0.0)	0.997
Married, staying with husband	84 (61.8)	52 (38.2)	10.02 (2.98, 33.69)	551024425.4 (0.0)	0.997
Education level					
College certificate	53 (68.8)	24 (31.2)	1	1	
Diploma	64 (80.0)	16 (20.0)	0.63 (0.31, 1.25)	1.25 (0.45, 3.48)	0.667
Bachelor's degree	25 (51.0)	24 (49.0)	2.28 (1.12, 4.64)	3.04 (1.04, 8.86)	0.042*
Forms of close family support					
Bought Food	79 (86.8)	12 (13.2)	1	1	
Financial Support	9 (47.4)	10 (52.6)	8.12 (2.93, 22.56)	6.62 (2.27, 19.31)	0.001***
Domestic support	14 (58.3)	10 (41.7)	5.80 (2.21, 15.25)	5.23 (1.88, 14.52)	0.002**
Psychological support	8 (50.0)	8 (50.0)	6.7 (2.27, 20.18)	5.45 (1.47, 20.20)	0.011*
Workplace factors					
Employment Sector					
Private	55 (56.7)	42 (43.3)	1	1	
Public Sector (government)	98 (77.2)	29 (22.8)	0.39 (0.22, 0.69)	0.51 (0.20, 1.30)	0.158
Had paid maternity leave					
No	7 (41.2)	10 (58.8)	1	1	
Yes	135 (71.4)	54 (28.6)	0.28 (0.10, 0.77)	0.47 (0.07, 2.92)	0.415
Workmate support					
No	108 (73.0)	40 (27.0)	1	1	
Yes	45 (60.3)	31 (40.8)	1.86 (1.04, 3.34)	2.95 (1.54, 5.67)	0.001***
Healthcare and individual factors					
Parity					
1–2 parity	91 (62.3)	55 (37.7)	1	1	
≥ 3 parity	62 (79.5)	16 (20.5)	0.43(0.22, 0.81)	0.67 (0.26, 1.70)	0.395
Number of ANC visits					
< 4 visits	5 (41.7)	7 (58.3)	1	1	
4 visits	96 (71.1)	39 (28.9)	0.29 (0.09, 0.97)	0.24 (0.06, 0.998)	0.050
> 4 visits	52 (67.5)	25 (32.5)	0.34 (0.10, 1.19)	0.18 (0.04, 0.82)	0.027*
Gave prelacteal feeds					
No	111 (65.3)	59 (34.7)	1	1	
Yes	31 (86.1)	5 (13.9)	0.27 (0.10, 0.71	0.16 (0.06, 0.45)	0.001***
Time taken to initiate BF after birth					
≤ 60 min (Within an hour)	137 (71.4)	55 (28.6)	1	1	
> 60 min	16 (50)	16 (50)	2.49 (1.17, 5.33)	2.92 (0.85, 10.30)	0.090

do shopping. I lost sleep… At delivery, there was no option but to go for a CS since the scan showed a double cord around the baby's neck. P#07

Thus, childbirth can be stressful to effect initiation and continuation of EBF.

Conversely, some mothers with normal birth initiated breastfeeding as recommended.

So, time of delivery, I went to a government hospital, I delivered normally, I did not have any problem, they showed me my baby, she was a girl; when we reached the ward, she was crying, and I started breastfeeding her. P#06

Therefore, the various context of birth can promote or hinder EBF practice.

b) Supportive social support systems for EBF success

Multiple social support systems at family, hospitals, and workplaces, helped mothers with EBF.

My immediate boss and my workmates were good to us. They covered my duties as I breastfed. At home, my maid was there to help. My husband regularly called to encourage me to breastfeed our baby. He always gave me financial and moral support. I had good socioeconomic support right from the workplace. P#04

Therefore, the social support system promoted some employed mothers' EBF success.

c) Breastfeeding-friendly hospital/healthcare facilities

Breastfeeding-friendly healthcare facilities promote maternal health, hence EBF success. For example, the ANC helped mothers to build strong self-efficacy to initiate and sustain EBF. ANC was a happiest moment for ***P#08***, *"I used to worry a lot because of the small size of my breasts, but during ANC, I remember some of the midwives telling me that the size of breasts doesn't matter if I start breastfeeding early."*

Similarly, baby-friendly healthcare facilities encouraged mothers to EBF as one participant stated, *"I was stressed, but the midwife asked me not to be stressed, milk will soon come, and she kept encouraging me to continue putting the breast in the baby's mouth." P#01.*

Additionally, breastfeeding-friendly healthcare facilities provide mothers with skills on how to express breastmilk.

> *The nurse taught me how to express my breastmilk, and this is what was used to feed the baby. Even after discharge from the hospital, I kept doing the same thing, like for two weeks; when he gained some energy to breastfeed by himself… P#09*

d) Breastfeeding-friendly workplace

The workplace environment influenced EBF success. Some mothers revealed many dimensions of their breastfeeding-friendly workplaces.

> *My boss allowed me to take breaks for my baby, so my colleagues would cover up for me as I go to meet my baby. This went on for two months, and when my baby turned six months and started taking some other soft foods, I would only breastfeed when I returned from work. P#02*

Additionally, other mothers had breastfeeding corners at work as stated by one participant, *"I had my corner to keep him. I breastfed every two hours. Work a little and attend to him. My workmates would carry him, and change diapers." P#04.*

Furthermore, better workplaces adjusted tasks to help mothers continue EBF as it was attested by one of the participants, *"When my boss got to know that I was still weak, he told me to stop teaching and instead sit in the office and attend to parents. My boss was a good person." P#09.*

In contrast, some workplaces did not allow mothers to breastfeed while at work.

> *My employer would not allow mothers to breastfeed at work. I would sometimes think of asking my sister to bring him for breastfeeding, but at the place where I work, my boss never wanted mothers to take their babies there… I introduced him to bottle feeding at 2.5 months. P#05*

Additionally, the far distance of the workplace required mothers to leave home very early and come back late in the evening.

> *When I returned to work, it was not easy for me. First of all, the workplace was far; I would wake up at 5:00 am to catch the bus. I had to introduce him to formula milk after my three months leave because I had no option. P#04*

Therefore, distant workplaces that separated a mother from the child for long hours influenced her decision to discontinue EBF.

e) Maternal EBF mindset

The maternal EBF mindset, described as a mother's beliefs, experiences, societal influence, and education that foster psychological, emotional, and practical approach to EBF [25]. It encompasses the mother's motivation, self-confidence and efficacy, commitment, adaptability and flexibility, and resilience in continuing EBF despite challenges.

Employed mothers who had a positive breastfeeding mindset balanced EBF and work demands.

> *It is not easy. It takes commitment and love. I was prepared for the baby. I had a passion for breastfeeding. My boy was a delicate baby. He was admitted to the ICU. I had my corner to keep him. I breastfed every two hours. You feel hungry every 30 min. When breastfeeding, you have to drink several flasks of porridge. You have to eat a balanced diet. I divided my day to balance the two. I planned the sequence of the day. I put it on a timetable. The maid brought my baby to breastfeed every two hours. Sometimes I missed the midday feeding. There was pressure from society and colleagues to breastfeed. I had to balance feeding and work. I worked with the dispensing of drugs, which allowed me to work and attend to him. P#07*

Other mothers used EBF successfully as a distraction from separation with the father.

> *I had a bad experience with relationships. I separated from his father. It was very traumatized. I had to tell my brain that I had to produce milk and balance work. I combined annual leave with maternity leave. I stayed home for approximately 8 months. I kept the milk in the breast to breastfeed at night… I did not mind whether the breast was big. That expe-*

rience excluded me from social life. I did not want anybody to comment. After work, the time at 4:00 is his. My peer support system said the breast shape would come back! P#10

Age of the child motivated some of the mothers to continue EBF as stated by one of the participates, *"My target was to exclusively breastfeed him for at least six months. This went on until my baby turned six months old. I started her on soft foods. I would only breastfeed her after work." P#02.*

Sustaining EBF had its costs; *"I spent a lot of money; I had to pay the cook who helped me take care of him when I was in class. I had to buy food for myself; I used to eat too much." P#03.* Therefore, EBF has a heavy cost that requires a mindset to succeed.

In contrast, maternal depression after birth interrupted EBF.

The truth is, I never had a happy moment. It is the first time. The first three months were like war. I was vomiting. I ate only silverfish and rice… The doctor checked me, and he told me that my bones were too small to let the baby's head pass. He took me for a C-section. The next morning, I was in pain. I regretted getting pregnant. I was in pain of labour, the pain of the C-section, mentally, I was off. I didn't want to breastfeed my child. Honestly, I did not like my child at any moment. I decided to buy him bottles of milk before he was one month old. I was depressed!… P#05

Therefore, maternal mindset is crucial to initiate and sustain EBF for the first six months of the infant's life.

Discussion

Prevalence of EBF success among mothers in the formal sector

This study found that nearly a third of mothers in the formal sector sustain exclusive breastfeeding (EBF) their infants for six months. While 94% initiated EBF within an hour of birth, this significantly decreased to 50.4% by three months, and only 31.7% at six months. These trends are consistent with other EBF studies among employed mothers in Ghana and Malaysia [26, 27]. Compared to regional data, this study's EBF prevalence of 31.7% at six months is higher than Kenya's formal sector of 15.8% [24]. However, our EBF is lower than Tanzania's formal sector of 38.5% [28], the WHO global and Uganda's national target of 50% and 66% respectively, by 2025 [9]. The 31.7% rate is lower than rates reported for EBF among mothers in Kampala's informal sector (42.8%) [8], and a sub-Saharan African review (33%) [12]. Similarly, a recent systematic review in sub-Saharan Africa reported a negative association between paid work and EBF success [29]. So, working can lower EBF in mothers.

Factors associated with EBF success in women working in the formal sector

Maternal sociodemographic and socioeconomic factors

Our study revealed that attaining a bachelor's of education was significantly associated with EBF success. This is consistent with a systematic review which showed that higher maternal education levels increased EBF success [30] and an Indonesia study [31]. These findings suggest that, educated mothers can easily learn about ANC visits and other aspects of information to EBF [32]. However, a review conducted in 25 Sub-Saharan African countries from 2010 to 2023 showed that higher maternal education reduced EBF success rates [33]. Similarly, a Bangladesh systematic review linked high maternal education to bottle-feeding practices and no initiation of colostrum [34]. The maternal demographic factors, such as age, marital status, and others, did not significantly predict EBF success among mothers in the formal sector. However, a Western Uganda study showed that being married significantly predicted EBF [35]. While, Ethiopian study showed that distant workplaces were associated with discontinuation of EBF [7, 36].

Supportive family environment for EBF

Our study further revealed that close family support was associated with successful EBF among mothers in the formal sector. The diverse support system (family, maids, health experts, workmates, and boda-boda riders) enhances EBF practices by mothers. Mothers who received financial support (this tipping is known in local dialect as *"ezo kameza"*) from their spouse were 6.62 times more likely to EBF than those who did not receive financial support. This finding is consistent with an Indonesian, a Northern Ethiopian study, and a South Africa on the effects of husband's support on EBF success [37–39]. This money (*ezo kameze*) sustained the engagement in EBF, yet salaries did not. Other social support was domestic support, such as in child-rearing, washing clothes, cooking, cleaning the house, and transporting the baby for breastfeeding at work, especially by maids or sisters. This is consistent with a Saudi Arabia study where maids played a crucial role in supporting EBF [38] and a review by Kalhor et al. [30]. The outcome of the supportive environment was a psychological mindset for EBF success. This is consistent with a study conducted in Poland, which showed that psychological factors were significantly associated with EBF success [40]. However, our study revealed that, depressed mothers discontinued EBF. This is consistent with a study conducted in Spain by [41]. Thus, this finding affirms that breastfeeding is a social behaviour [42].

Breastfeeding-friendly workplaces facilitated EBF success in the formal sector

Many factors intersect at workplaces to predict the success or failure of employed mothers to sustain EBF success. Three months of paid maternity leave sustains breastfeeding for a maximum of two to three months. Other services include breaks, breastfeeding space, and workmate support. However, our study showed that workmate support increased the likelihood of EBF success by 2.95 times. Workmates took up tasks while the mother breastfed her baby. This finding is consistent with reduced workload which allows a mother physical rest, time to bond with her baby, and the ability to produce breast milk to breastfeed [43]. This finding is also consistent with other findings in sub-Saharan African countries [12, 44, 45], Indian, and USA studies [44, 46].

Mothers who had supportive supervisors had no significant association with EBF. This was consistent with a systematic review by [43], which showed that managerial and organizational support had no significant associations with overall breastfeeding duration. However, our finding was not consistent with a study conducted in Spain which showed underscored importance of managers' support in influencing continued EBF after mother resuming work [47]. Our study on the other hand showed that, monthly salaries, employment sector, and others were not significantly associated with EBF success. Thus, mothers with high self-efficacy foster EBF success amidst workplace demand, which is consistent with prior findings [48].

Breastfeeding-friendly healthcare promotes EBF success by mothers in the formal sector

Breastfeeding-friendly hospitals protect, promote, and support EBF. These EBF critical services are integrated into ANC messages and other health education talks [49]. Four or more ANC were significantly associated with higher EBF success. Our study findings were consistent with other studies conducted in Ghana and Indonesia [50–52].

Finally, our study showed that giving prelacteal feeds shortened EBF success. This is consistent with a study conducted by Neves et al. [53]. This shows a gap in quality of care to mothers by some health workers, and/or facilities maintaining outdated policies and practices like separating mothers from their babies immediately after birth, as evidenced in the UNICEF report [54].

In summary, the quantitative and qualitative results revealed that context, social support systems at family, workplace, and healthcare, breastfeeding-friendly healthcare facilities, and workplaces interact to create a positive maternal mindset that promote success among mothers in the formal sector. These themes fit theory-relevant concepts like social cognition and individual cognition, mindset, and EBF behaviour. These concepts align with Social Cognitive theory [55].

Theoretical, methodological, research, practice, and policy contributions to promoting EBF at the workplace

We contribute to how and why working women in the formal sector succeed in EBF. The rate of EBF groups rapidly increases as they end their paid maternity leave. So, they require an interplay of supportive environments at the family, health care, and workplace. These places must offer breastfeeding-friendly support to empower the maternal mindset for EBF. This interaction is best explained by the Social Cognitive Theory of personality by Bandura [55].

Limitations of the study

One of the limitations of this study is the reliance on self-reported data from the participants, which may be subject to recall bias or social desirability bias. Participants may overestimate their EBF practices for social desirability. This could have resulted in some important factors being overlooked or not fully explored. Thus, future research should test how well the social cognitive theory explains and predicts EBF practices.

Conclusions

A third of our working mothers had succeeded in EBF practices. Significant factors for EBF success include, education level (bachelor's degree), supportive environments at the family, healthcare, and workplace to influence a woman's mindset for EBF. So, we recommend that practitioners, managers, and policy-makers integrate, supportive environments into family social support, promote maternal education, and create breastfeeding-friendly environments (workplaces and healthcare) that empower women to an EBF mindset based on Social Cognitive Theory to optimize EBF rates among employed Ugandan women.

Abbreviations

ANC	Antenatal Clinic
AOR	Adjusted odds ratio
CI	Confidence interval(s)
DHS	Demographic Health Survey
EBF	Exclusive breastfeeding
KCCA	Kampala Capital City Authority
MNCH	Maternal, Neonatal and Child Health
OR	Odds ratio
Reg. No	Registration number
UBOS	Uganda Bureau of Statistics
UNICEF	United Nations Children's Emergency Fund
USA	United States of America
WHO	World Health Organization

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Author contributions
All authors contributed to the study design. EJ: Developed the study strategy, conducted the study, wrote the final report, and drafted the manuscript. NCP: Supervised the development of the study strategy, approved it, and supervised the conducting and writing of final study report. NCP: also edited the manuscript. All the authors approved the final manuscript.

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Data availability
The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Mulago National Referral Hospital Research Ethics Committee issued the ethical clearance (reference number: MHREC 2139). Respective hospitals issued the administrative authorization to conduct the study. Informed consent was obtained from each study participant before the interviews. Participants' rights to join or withdraw from the study at any time during the study were clearly stated and explained to each participant before the exercise. Participants' privacy was observed by not capturing any name(s) or personal contacts on the questionnaires, no video recording, and/or taking pictures of participants while they participated in the exercise. Contacts (emails or phones) of those who were enrolled for key informant interview audio recordings during the sessions were held with the utmost confidentiality, and at the end of the exercise, the contacts were deleted.

Consent for publication
Not applicable in this section.

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Competing interests
The authors declare no competing interests.

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