Journal of BioMed Research and Reports
2025 Volume 8, Issue 1
DOI: 10.59657/2837-4681.brs.25.171

BioRes Scientia
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Research Article

Open Access

Factors Associated with Successful Exclusive Breastfeeding Among Employed Mothers in the Formal Sector-A Mixed Method Study of Kampala Capital City

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Abstract

Background: Globally, studies correlate exclusive breastfeeding (EBF) for the first six months of an infant's life with reduced risks of breast and ovarian cancer for the mother, and reduced risk of infectious morbidity for the infant. However, many employed women discontinue EBF before six months, while others succeed. However, limited research on the factors that enable some employed mothers succeed in EBF exists. This study aims to identify and explain the factors that enable EBF success among employed mothers in the formal sector.

Method: The study employed a mixed-methods, utilizing questionnaires and key-informant interviews to collect data. Multivariable logistic regression analysis established associated factors with EBF. The grounded theory technique was used to code findings, which were then triangulated to understand how and why some employed mothers succeeded in EBF and others failed.

Results: Participants mean age was 27years (± SD=3.87). EBF prevalence was 30.1%. Significant factors were: education (AOR: 3.04. 95% CI: 1.04-8.86. P=0.042*), family support (AOR: 0.45. 95% CI: 0.24-0.85. p=0.02), financial support (AOR: 6.99. 95% CI: 2.46-19.88. P<0.001), domestic support (AOR: 4.87. 95% CI: 1.80–13.14. p=0.002), psychological support (AOR: 3.83. 95% CI: 1.16-12.65. p=0.028), workmate support (AOR: 2.00. 95% CI: 1.10-3.64. p=0.042), attending more than four antenatal care visits increased EBF success by 18%. Prelacteal feeding decreased EBF success by 23%. Themes: context, social support system, breastfeeding-friendly hospitals and workplace, and maternal EBF mind-set. Four theories were abstracted: social and individual cognition, EBF behavior, and institutional factors, that fit social cognitive theory.

Conclusion: The study revealed that associated factors for successful EBF were: Bachelor's education level, financial support, social support systems (at family, workplace, and healthcare), strong maternal EBF mindset, and breastfeeding-friendly policies in hospitals and workplaces. Thus, concurrent interventions directed at promoting: women's further education, basic-financial package for breastfeeding mothers, strong social support systems (at family, workplace, and healthcare), building maternal EBF mind-set, and implementation of breastfeeding-friendly (hospitals and workplaces) polices would increase EBF in the formal sector.

Keywords: successful exclusive breastfeeding; employed mothers; formal sector; breastfeeding-friendly workplaces; social support systems; maternal mind-set

Introduction: Background

Globally, studies correlate exclusive breastfeeding (EBF) for the first six months of an infant's life with reduced risks of breast and ovarian cancer for the mother (Obeagu & Obeagu, 2024; Stordal, 2023), and reduced risk of infectious morbidity for the infant (Hossain & Mihrshahi, 2022). Despite the vast evidence on health benefits of EBF for the mother–infant pair (UNICEF & WHO, 2023), many countries rarely attain the recommended 60% prevalence of EBF (WHO, 2015). The recent EBF prevalence globally was 48% in 2023 (UNICEF, 2023); with a range between 26% and 66%. North America EBF (26%), Europe and Central Asia (32%) (UNICEF, 2018), the Middle East, North Africa (33%), West and Central Africa (33%), and Eastern and Southern Africa (56%) (Shrestha *et al.*, 2021; UNICEF, 2018). The prevalence of EBF in Uganda among infants aged ≤ 6 months is 66%, but it varies with maternal employment status (UBOS, 2016). EBF prevalence among mothers employed in the informal sector was 42.8% (Nabunya *et al.*, 2020). Thus, maternal employment predicts EBF success for the first six months (Ejie *et al.*, 2021; Shrestha *et al.*, 2021).

Many mothers struggle to balance EBF and work (Ickes *et al.*, 2021). For example, long hours of separation from infants (Adugnaw *et al.*, 2023;

Maharlouei *et al.*, 2018), the stress of returning to work (Abekah-Nkrumah *et al.*, 2020), family–workplace support, and policies such as paid maternity leaves, breastfeeding breaks, and rooms or corners for employed mothers in most countries have affected EBF rates, which remain low (UNICEF & WHO, 2023). Importantly, many employed mothers adapt creative strategies to successful EBF. For example, they may have paternal or family support (Martínez-Vázquez *et al.*, 2022; Ratnasari *et al.*, 2017). Thus, this study seeks to determine the factors associated with successful EBF among mothers in the formal sector.

Methods

Study design, area, population, and inclusion criteria

A mixed-method sequential explanatory design was employed (Cresswell & Plano-Clark, 2011). First, the quantitative component collected and analysed the data. 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, a city in Uganda with five (5) administrative divisions: Central, Kawempe, Rubaga, Makindye, and Nakawa (Walusansa *et al.*, 2022) with approximate population of 1,507,080 million people. Approximately 110,750 persons work in the formal sector in the city; Uganda has 77% private services and 23% public services (UBOS, 2018). The point of data collection was the selected hospital in Kampala Capital City. The study unit and unit of analysis were mother–child pairs at the immunization and/or paediatric OPD clinic. The city has the best and busiest hospitals, such as Mulago National Referral, which delivers over 39,000 births/year (Ssempiira *et al.*, 2017), and St. Francis Nsambya Hospital, which delivers 6000 babies/year (UBOS, 2016). To participate in this study, 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; mother must have consented to participate in the study.

Sample Size Determination and Sampling Technique

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 (Ickes *et al.*, 2020).

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

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

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

The sample size for the qualitative phase was ten (10) mothers purposively selected as key informants. We interviewed them via key informant interviews to explain the findings and relationships of the quantitative phase.

In this study, the first step was to screen participants (mother-child pair). The second step was to perform simple random sampling on the participants. We used a dice throw (a physical method of simple random sampling technique) to determine how to select the participants, and a value of three (3) was the outcome of the dice throw. Thus, during data collection, every third (3rd) mother–child pair who came for immunization services and/or OPD paediatric care in the selected hospitals and met the inclusion criteria was enrolled in the study.

Data Collection Instruments and Procedures

The questionnaire and the key informant interview guide 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 OPD paediatric clinic where the study was conducted were recruited as research assistants (RAs) to collect data from the participants for the specified period. Prior training was given to them (RAs) on: how to obtain informed consent and proper data handling during the data collection exercise, participants' confidentiality, etc.

For quantitative data collection, first, the RA obtained informed consent from each participant who met the inclusion criteria; semi structured

questionnaires written in English were used to collect the data from the participants for a period of 12 weeks. This adequate time allowed the research assistants to collect quality data from the participants. The principal investigator (PI) supervised the data collection; checking for completeness of questionnaires, observance of ethical guidelines, etc. Qualitative data collection, the PI collected data by key informant interviews. Participants who consented to participate in the key informant interview were asked to provide their details in the pre-session feedback form. The PI used online via various means of communication (phone calls or online platforms such as Zoom and Google Meet) that were preferable to individual participant. The interviews followed a guide; each session lasted about 30–45 minutes. The PI recorded the interviews, checked for data completeness during collection and data entry.

Data Analysis

Quantitative data

The collected data were manually checked for completeness and correct coding before being entered into Epi Data Info version 7 for data cleaning and 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 (any mother who had exclusively breastfed for the first six months) and independent variables such as maternal, child, and workplace factors; social support; and demographic factors at the 95% confidence interval. The variables with $p<0.05$ 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 recorded and variables with a p value of less than 0.05 were considered to be significantly associated with exclusive breastfeeding.

Qualitative Data

Qualitative data from the mothers who provided key information were transcribed, and then deductive coding was performed in ATLAS Ti version 5.21.2 according to the thematic question categories. Thereafter, the contents from the thematic areas were analyzed to triangulate the quantitative data. The supervisor, conversant with qualitative data, reviewed the audios, quotes, and explanations. Additionally, emerging key submissions from the thematic areas were inductively coded, analyzed, and reported as part of triangulation

Results

Descriptive results

This study enrolled 224 participants (mothers working in the formal sector), who had infants aged between 6-18 months. The mean age of participants was 27.31±3.653 years (SD). More than three-quarters (76.3%) of the participants were aged 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 participants held a bachelor's degree education level. Nearly half (48.2%) of the participants were employed in the service sector, and majority (63%) earned Uganda Shillings 500,000/= and above. The majority (95.5%) of the participants had paid maternity leave of three months. More than a quarter (28.6%) of mothers received support from their managers/supervisors, and approximately (34%) also received support from their workmates. About three-quarters (75%) of the participants had received support from close family during EBF in form of food provision, financial, domestic, and psychological. More than half (60%) of participants had attended at least the recommended four antenatal visits during pregnancy. Most (80%) deliveries were normal, and term births (91%). The majority of the participants-initiated breastfeeding within an hour of birth. Only 17% of participants gave prelacteal feeds after birth. This study revealed that only 31.7% of the participants had EBF for the first six mothers.

Factors associated with Exclusive Breastfeeding success among mothers in formal sector (Bivariate analysis)

Sociodemographic and Economic Factors

In this study, odds ratios (OR) were calculated at 95% confidence interval (CI) to determine the significantly associated factors. The study revealed that, education Level (bachelor degree), marital status (married), Close family member(s) support in form of, Financial Support, Domestic support (chores), and psychological support were significantly associated with EBF success among mothers in formal sector.

The odds of EBF success for mothers with bachelor's degree were 2.28 times higher than the odds for mothers with college certificate to EBF (OR. 2.28; 95% CI. 1.12-4.64; p=.023). The odds of EBF success among married mothers were approximately 12 times more likely than single mothers (OR. 12; 95% CI. 3.07-51.42; p<.001**). Similarly, the odds of EBF success among mothers who got close family members support were 0.48 times less likely than those who did not get any support (OR. 0.49; 95% CI.0.26-0.91; p=0.024*). However, the odds of EBF success among mothers who got financial support were 8.12 times more likely than the reference group (who were bought food) (OR. 8.12; 95% CI. 2.93-22.56). The odds of EBF success for mothers who received domestic support were 5.80 times more likely than the reference group (OR. 5.80; 95% CI. 2.21-15.25; p<0.001***). Furthermore, the odds of EBF success for mothers who received psychological support were 6.77 times more likely compared to the reference group (OR. 6.77; 95% CI. 2.27-20.18; p<0.001***). However, maternal age, religion, distance between residence and workplace, occupation, extra paid Job, and monthly salary (UGX.) were not significantly associated with EBF success among mothers in the formal sector (Details in table 1 below).

Table 1: Bivariate analysis between maternal demographic, socioeconomic factors and EBF

Variable	Exclusive Breast Feeding		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	57(69.5)	25(30.5)	82	1	
Diploma	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)	.023*
Marital Status					
Single	48(94.1)	3 (5.9)	51	1	
Married, not staying 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					
1-5km	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					
No	32(56.1)	25(43.9)	57	1	
Yes	121(72.5)	46(27.5)	167	0.49(0.26-0.91)	0.024*
Type of support					
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**

*Please note. * Significant at p<.05*

Maternal workplace factors associated with EBF

The maternal workplace factors associated with EBF success were working in the public sector, paid maternity leave, and workmate support during breastfeeding. This study revealed that the odds of EBF success among mothers working in the public sector were 0.39 less likely than those mothers working in the private sector (OR. 0.39; 95% CI. 0.22-0.69; p<0.001***). Similarly, the odds of EBF success among mothers who got paid maternity leave were 0.34) less likely than those mothers who did not get paid maternity leave (OR. 0.34; 95% CI. 0.13-0.89; p=0.029*). On the other hand, the odds of EBF success among mothers who had workmate support were 1.9 times more likely than those who had no workmate support (OR. 1.86; 95% CI. 1.04-3.34; p=0.037*). However, part-time job contracts, taking unpaid maternity leave, and support from managers showed no significant association with EBF among mothers in formal sector (Details in table 2).

Table 2: Bivariate analysis between maternal workplace factors and EBF

Variable	Exclusive Breast Feeding		n	Unadjusted OR 95% CI	P-Value
	No (%)	Yes (%)			
Employment Sector (224)					
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
Had a paid maternity Leave					
No	8(44.4)	10(55.6)	18	1	
Yes	145(70.4)	61(29.6)	206	0.34(0.13-0.89)	0.029*
Months of maternity Leave					
1 month	5(71.4)	2(28.6)	7	1	
2 Months	11(58.8)	8(41.2)	19	1.82(0.28-11.87)	0.532
3 Months	126(72.4)	48(27.6)	174	0.95(0.18-5.08)	0.954
4 Months	3(50.0)	3(50.0)	6	2.50(0.25-24.72)	0.433
Had an unpaid Maternity Leave (18)					
No	3(50.0)	3(50.0)	6	1	
Yes	5(41.7)	7(58.3)	12	1.40(0.20-10.00)	0.738
Months of unpaid maternity Leave (12)					
1 month	3(37.5)	5(62.5)	8	1	
2 months	2(50.0)	2(50.0)	4	0.60(0.53-6.80)	0.680
Breastfeeding support (224)					
Breastfeeding corner	5(45.5)	6(54.50	11	1	
Breast milk 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 (224)					
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 (224)					
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*

*Please note. * Significant at p<.05*

Maternal healthcare and infants' factors associated with EBF

The study revealed that parity, ANC visits, giving prelacteal feeds, breastfeeding initiation after 60 minutes, and infants age were significantly associated with EBF.

The odds of EBF success among mothers with a parity of three were 0.38 times less likely than those with a parity of less than three (OR. 0.38; 95% CI. 0.16-0.87; p=0.023). The odds of EBF success among mothers who had attended four ANC visits were 0.29 times less likely than for those mothers with less than four visits (OR. 0.29; 95% CI. 0.09-0.97; 0.044*). The

odds of EBF success among mothers who gave prelacteal feeds after birth were 0.27 less likely than those who did not give prelacteal feeds (OR. 0.27; 95% CI. 0.10-0.71; p=0.008*). similarly, the odds of EBF success among mothers who initiated breastfeeding after 60 minutes were 2.49 more likely than those who initiated EBF within an hour (OR. 2.49; 95% CI. 1.17-5.33; p=0.019*).

Furthermore, the odds of EBF success among mothers with infants aged 10-12 years were 0.27 times less likely than those with infants aged 6-9 months (OR. 0.27; 95% CI. 0.11-0.69; p=0.006*). Additionally, the odds of EBF success among mothers with infants aged 13-15 years were 0.30 times less likely than mothers with infants aged 6-9 months were (OR. 0.30; 95% CI. 0.40-0.79; p=0.03*) (Details in table 3).

Table 3: Bivariate analysis between maternal healthcare factors, infant factors, and EBF

Variable	Exclusive Breast Feeding		Total (n)	Unadjusted OR 95% CI	P-Value
	No (%)	Yes (%)			
Parity					
≤ 3 parity	91(62.3)	55(37.7)	146	1	
3 parity	35(81.4)	8(18.6)	43	0.38(0.16-0.87)	0.023*
>3 parity	27(77.1)	8(22.9)	35	0.49(0.21-1.16)	0.103
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					
Caesarian section	33(75)	11(25)	44	1	
Normal	120(66.7)	60(33.3)	180	1.50(0.71-3.17)	0.289
Giving anything rather than breast milk after birth					
No	119(64.3)	66(35.7)	185	1	
Yes	34(87.2)	5(12.8)	39	0.27(0.10-0.71	0.008*
Time of initiation of BF after birth					
≤ 60 mins (Within an hour)	137(71.4)	55(28.6)	192	1	
>60 Minutes	16(50)	16(50)	32	2.49(1.17-5.33)	0.019*
Baby Age Range					
6-9 months	76(61.8)	47(38.2)	123	1	
10-12	36(85.7)	6(14.3)	42	0.27(0.11-0.69)	0.006*
13-15	36(80.0)	9(20.0)	45	0.30(0.40-0.79)	0.030*
16 and above	5(35.7)	9(64.3)	14	2.91(0.92-9.21)	0.069
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 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

*Please note. * Significant at p<.05*

Factors associated with Exclusive Breastfeeding success among mothers in formal sector (Multivariate analysis)

Sociodemographic and economic factors promoting EBF

1) *Maternal education*. The odds of EBF success for mothers with bachelor's degrees were 3.04 times higher than for mothers with college certificates (AOR. 3.04; 95% CI. 1.04-8.86; p=.042*).
2) *Close family support.* The study revealed that close family member support was significantly associated with successful EBF (AOR. 0.45; 95% CI. 0.24-0.85; p=0.014*).
3) This study showed that close family members' support increased the likelihood of EBF success for mothers by 49% than mothers who did not have the support.
4) *Types of social support.* The odds of EBF success for mothers who received 1) financial support were 6.99 times higher than those who were provided food. (AOR. 6.99; 955 CI. 2.46-19.88; p<0.001***). 2) The odds of EBF success among mothers who received domestic support or chores were 4.87 times more likely than those who received food support, (AOR. 4.87; 95% CI. 1.80-13.14; p=0.02*), and 3) The odds of EBF success among mothers who received

psychological support were 3.83 times more likely than those who received food support, (AOR. 3.83; 95% CI. 1.16-12.65; p=.028*).

5) *Child's age.* The odds of EBF success among mothers with babies ≥ 16 months were 11.8 times more likely than those among mothers with infants aged 6–9 months (AOR. 11.84; 95% CI. 1.37-102.39; p=0.025*). However, even though this study revealed that a child age (being ≥ 16 months old) was associated with EBF success, the wide confidence interval makes this finding inconclusive.
6) Workplace factors promoting EBF
7) *Workmates support.* The odds of EBF success among mothers who received support from workmates were 2 times more likely than those among mothers who did not (AOR. 2.00; 95% CI. 1.10-3.64; p=0.023*).
8) Healthcare facility factors promoting EBF
9) *Attending ANC visits.* This study revealed that attending more than four ANC visits increased the odds of EBF success for mothers by 18% than mothers who had <4 visits. (AOR. 0.18; 95% CI. 0.04-0.82; p=0.027*).
10) *Prelacteal feed(s) after birth.* The study revealed that the odds of EBF success for mothers who provided prelacteal feed after birth were 0.23 less likely than mothers who did not provide prelacteal feeds (AOR. 0.23; 95% CI. 0.07-0.78; p=0.018*). (Details in table 4 below).

Table 4: Multivariable logistic Regression Analysis between Predictor variables and EBF

Variable	Exclusive Breast Feeding		Unadjusted Odds Ratio (uOR)	Adjusted Odds Ratio aOR (95% CI)	p value
	No (%)	Yes (%)			
Sociodemographic & economic factors					
Marital Status					
Single	45(93.8)	3 (6.3)	1	1	
Married, not staying husband	13(59.1)	9(40.9)	12.57(3.07-51.42)	243462039.8(0.00)	0.997
Married, staying husband	84(61.8)	52(38.2)	10.02(2.98-33.69)	541779306.2(0.0)	0.997
Child age category					
6-9 months	76(61.8)	47(38.2)	1	1	
10-12 months	36(85.7)	6(14.3)	0.27(0.11-0.69)	0.69(0.20-2.43)	0.564
13-15	36(80.0)	9(20.0)	0.30(0.40-0.79)	1.27(0.38-4.22)	0.697
16 and above	5(35.7)	9(64.3)	2.91(0.92-9.21)	11.84(1.37-102.39)	0.025*
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*
Close family member(s) support					
No	32(57.1)	24(42.9)	1	1	
Yes	110(73.3)	40(26.7)	0.49(0.26-0.91)	0.45(0.24-0.85)	0.014*
Type of 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)	6.99(2.46-19.88)	0.000**
Domestic support	14(58.3)	10(41.7)	5.80(2.21-15.25)	4.87(1.80-13.14)	0.002**
Psychological support	8(50.0)	8(50.0)	6.77(2.27-20.18)	3.83(1.16-12.65)	0.028*
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)	0.36(0.12-1.08)	0.068
Had a 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)	0.46(0.07-3.13)	0.428
Workmate Support					
No	108(73.0)	40(27.0)	1	1	
Yes	45(60.3)	31(40.8)	1.86(1.04-3.34)	2.00(1.10-3.64)	0.023*
Healthcare & individual cognition factors					
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)	0.05
> 4 visits	52(67.5)	25(32.5)	0.34(0.10-1.19)	0.18(0.04-0.82)	0.027*

Parity					
≤ 3 parity	91(62.3)	55(37.7)	1	1	
3 parity	35(81.4)	8(18.6)	0.38(0.16-0.87)	0.75(0.21-2.70)	0.66
>3 parity	27(77.1)	8(22.9)	0.49(0.21-1.16)	0.706(0.16-3.05)	0.641
Given prelacteal feeds					
No	111(65.3)	59(34.7)	1	1	
Yes	31(86.1)	5(13.9)	0.27(0.10-0.71	0.23(0.07-0.78)	0.018*
Time taken to initiate BF after birth					
≤ 60 minutes (Within an hour)	137(71.4)	55(28.6)	1		
>60 Minutes	16(50)	16(50)	2.49(1.17-5.33)	2.79(0.76-10.24)	0.122

Qualitative results that explain the quantitative findings and relationships

In this study, we used multiple case study designs with key informant interviews to collect data from 10 key informants. These were employed mothers in the formal sector in Kampala who experienced EBF practices (central phenomenon). Data was coded and formed core categories and themes to abstract theory-relevant concepts that explained our key quantitative findings. The five themes crafted were: context, social support systems, breastfeeding-friendly healthcare facilities, breastfeeding-friendly workplaces, and EBF mind-set.

a) Context.

Some key informants revealed that in the first trimester, they experienced vomiting, lack of appetite, general weakness, etc. The second trimester seemed okay. However, during the last trimester, anxiety affects their sleep. Delivery, such as by caesarean section or premature birth, evokes physical, emotional, and financial stress for some mothers. See excerpt˜ EBF07 "*I lost sleep*"

Pregnancy is sometimes tiresome. You are hungry you have nausea. I never wanted to bathe. I used to take sugar care and water. At six months, I ate a lot. I had a lot of energy. I could run. At seven months, I was worried a lot. I was worried about how to pay the hospital bills and shopping. I lost sleep... At delivery, there was no option but to go for a Caesarean Section since scan showed double code. ˜***EBF07***

Therefore, the various contexts of birth, such as by Caesarean section or premature birth, evoke physical, emotional, and financial stress for some mothers. This partly explained why some employed mothers interrupted EBF while others succeeded in EBF for six months.

b) Supportive social support systems for EBF success

Multiple social support systems at family, hospitals, workplaces, etc., 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. ˜**EBF04**

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

In contrast, the return to workplaces interrupted EBF. First, workplaces that did not allow breastfeeding on duty were included.

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, when I started working after my maternity leave. My sister fed him. ˜**EBF05**

Second, the routine of waking up early.

"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 up with the bus. Those very early morning hours were truly hard for me to wake up to breastfeed my child. I had to introduce to him formula milk for him after my three months leave because I had no option." ˜***EBF04***

Thus, workplace policies and practices decrease EBF success for some mothers.

c). Breastfeeding-friendly hospital/healthcare facilities

Breastfeeding-friendly healthcare facilities promote maternal health hence EBF success. The ANC programs enhance mothers to build strong self-efficacy to initiate breastfeeding early and succeed in EBF.

I had about eight to ten ANC, because each time I would feel pain, I would go to health facility, but it was more than ten, I can't recall very well. So time of delivery, I went to a government hospital, I delivered normally, I did not have any problem... ˜***EBF06***

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

The nurse taught me how to express my breast milk, and this is what was used to feed the baby. Even after discharge from hospital, I kept doing the same thing like for two weeks;

*when he gained some energy to breastfeed by himself... ~**EBF09***

d). Breastfeeding-friendly workplace

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

*"...My boss also allowed me to take breaks for my baby, so my colleagues would cover up for me as I go 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." **EBF02***

Additionally, ~EBF07 had a quote from a supportive environment at work. She said,

I had my corner to keep him. I breastfed every two hours. Work a little and attend to him. My workmates would carry him, change diapers, etc.

An example of task adjustment to help mothers continue EBF, she said:

*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 visitors and parents. My boss was a good person" **EBF09.***

Therefore, breastfeeding-friendly workplaces have dimensions such as maternity leave and task adjustment.

EBF was also expensive;

*"I spent a lot of money than before; I had to pay the cook who helped me take care of him when I was in class. I also spent a lot of money on buying food for myself; I used to eat too much. I would come with the baby and take him to her, and I go to class..." ~**EBF03~***

Therefore, EBF has a heavy cost that requires a mind-set to succeed.

In contrast, some mothers struggled with maternal depression, which interrupted EBF.

> *What were your happiest moments with this child? Don't even ask me that question! 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 think that is why I decided to even buy him bottles of milk before he was one month old. I was depressed!... ~EBF05*

e). Maternal EBF Mind-set

Employed mothers who had a breastfeeding mind-set for the first six months adapted to physical, social, economic, etc., to balance EBF and work demands.

*It is not easy. You feel hungry every 30 minutes. When breastfeeding, you have to eat 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. Sometimes I leave work at 5:00 or 8:00 pm. There was pressure from society and colleagues... Breastfeeding was not putting me under pressure. I had to balance feeding and work. ~**EBF07***

Additionally, it takes commitment and passion to EBF.

*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. I work with the dispensing of drugs, which allowed me to work a little and attend to him... ~**EBF07***

EBF successful employed mothers were dedicated and remained attached to their children.

*... I had a bad experience with relationships. I separate 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 keep the milk in the breast to breastfeed at night... I did not mind whether the breast was big. That experience brought me to exclusion. No social life. I did not want anybody to comment. After work, the time at 4:00 is his. My support system did not mind about the looks. They said the breast shape would come back! ~IV. ~**EBF10***

Age of the child

*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 ~**EBF02***

In summary, the quantitative and qualitative results revealed that: context, social support systems (both at family and workplace), breastfeeding-friendly healthcare facilities, and workplaces, and maternal mind-set intersect to harm or protect, promote, mothers to EBF success.

Discussion

The study revealed that only one-third of mothers had EBF success for the first six months. The prevalence of EBF was 94% at birth. EBF decreased to 50.4% for the first three months. The study also revealed that women in the public sector breastfeed less than those in the private sector. The drop in EBF coincided with the end of the paid maternity level. Finally, EBF

decreased to 31.7% in the first six months after childbirth. This finding is consistent with studies conducted in Ghana, where the prevalence of EBF decreased from 91% at birth to 10.3% at six months, and in Malaysia, from 47.4% at two months to 32.1% at three months (Dun-Dery & Laar, 2016; Revheim *et al.*, 2023). Similarly, consistent with a recent systematic review on EBF in East Africa, workplaces have harmed the EBF success of many mothers (Mgongo *et al.*, 2024).

The prevalence of EBF was significant for close family support, workmate support, high maternal education level, more than four ANC visits, etc. This finding was further supported by the quantitative and qualitative phases of multiple factors from home, healthcare facilities, and the workplace. Importantly, the mothers who succeeded in exclusively breastfeeding for the first six months adopted simple strategies, such as taking annual leave after maternity leave, hiring help (a maid, 'boda-boda' cyclist, a cook, etc.), task adjustment, etc., to promote EBF.

This prevalence of EBF at 30% is below the recommended WHO target and the Uganda national average of 60% and 44%, respectively. A recent study in Kampala among employed mothers in the informal sector showed an EBF prevalence of 42.8% (Nabunya *et al.*, 2020). The current prevalence of EBF is slightly higher than that in Kenya, at 15.8% (Ickes *et al.*, 2020). However, this percentage is lower than that reported in recent studies in sub-Saharan African countries (33%) (Ejie *et al.*, 2021).

Sociodemographic and economic factors influencing EBF success in the formal sector.

The present study revealed that attaining a bachelor's degree predicted EBF success. This confirmed several studies showing that higher maternal education levels were associated with improved breastfeeding indicators (Atimati & Adam, 2020; Mekebo *et al.*, 2022; Mohammed *et al.*, 2023). A study conducted in Indonesia on the effects of mothers' education on achieving exclusive breastfeeding revealed that mothers who attained tertiary education were 1.2 times more likely to have EBF than those who did not enrol in school (Laksono *et al.*, 2021). This could be because as mothers acquire more knowledge and skills through education and experience, they tend to value certain practices, including EBF. A key informant attested to this fact of education significance.

"...you need experience. Senior IV and certificate. You have to learn. How to handle the breast. If I had a diploma, it would be easy to learn". ~EBF07

However, other studies have shown that low maternal education is correlated with EBF success rates ranging from 42.8-64% (Nabunya, 2018).

This study further revealed that, social support systems, as assessed by close family support, were associated with successful EBF among mothers in the formal sector. Mothers use diverse support systems in the form of psychological, financial, domestic help, etc. Support systems include family members, maids, boda-boda riders, health experts, and workmates, which enhance EBF practices by mothers. Financial support had the highest odds of EBF success, 6.99 times more likely; this is consistent with study findings conducted in Indonesia on effects of husband's support and economic status level on EBF (Mamoh *et al.*, 2023); similarly, consistent with another study findings were mothers stopped EBF due to lack of financial support (Witten *et al.*, 2020); followed by domestic support 4.87 times more likely, and psychological support 3.83 times more likely.

Financial support provides the mother with a sense of financial security; the surplus funds the mother receives relieve her from anxiety and fears of running out of money to meet the daily demands of EBF. The mother has full control over the baby's needs and other household necessities. Mothers feel empowered to continue EBF even after resuming work. The mother is in a position to hire maids to help them; her (maid) roles are to care for the baby while the mother is at work, transport the baby to the workplace for breastfeeding, update the mother, etc. As this key informant said, "*At home, my maid was there to help.*" *~EBF04*. Thus, good maid buffers the maternal stress of balancing EBF and workplace demands. This evidence was consistent with a study in Saudi Arabia, where maids played a critical role in supporting breastfeeding mothers (Gebrekidan *et al.*, 2021). Additionally, *~EBF02* explained why financial support enabled EBF.

"*I had to get a maid. I also got a particular 'boda-boda' rider from the stage near our home. I always called him to bring my baby for breastfeeding at my workplace.*" *~EBF02*.

Thus, financial support empowered some mothers to transport their babies to and from the workplace for EBF. Furthermore, a key informant added the dimension of appraisals and advice from peers and professionals such as doctors:

"*... The body shape will return; the Doctor would come and check on mothers who had given birth to premature babies. To date, I have gone to the hospital to encourage my mother*" *~ EBF10.*

This finding was consistent with other studies conducted in Uganda and Indonesia which established importance of peer support in promoting EBF success (Ratnasari *et al.*, 2017; Rujumba *et al.*, 2020). Domestic work, such as washing clothes, cooking, and cleaning the house, is needed for breastfeeding mothers. Therefore, domestic support creates adequate time to breastfeed with minimum interruption. Paternity support, such as financial, emotional support, etc., was provided to build a natural mind-set for their wives to EBF.

The present study revealed that psychological support correlates EBF success. Mothers who received emotional support were 3.83 times more likely to have EBF success. This finding is consistent with a study conducted among 70 mothers with children aged 7–24 months that revealed psychological support was significantly associated with EBF (Fadjriah *et al.*, 2021; Tewabe *et al.*, 2017). This means that close family members offset the factors that hinder EBF success among employed mothers.

Our findings revealed that the support provided employed mothers with adequate time and peace of mind and built confidence and self-efficacy to sustain EBF; which aligns with a study that reported that mothers who were depressed were four times more likely not to practice EBF (Cato *et al.*, 2019). In this study, mothers drew emotional support from their social support system (family, workplace, and hospitals) as attested by the key informants:

The good thing my sister was always there to counsel me… At work, my workmates would encourage me to breastfeed, and like my baby, because each time I remembered the pain I went through, I would just feel angry at him. It took me a long time to let go of what I went through because of this baby EBF05.

"He supported me financially and morally but always called me and encouraged me to breastfeed our baby" EBF04

Workplace factors that facilitate EBF success in the formal sector

The quantitative phase generated the statistics that were explained by the qualitative phase. Many factors intersect in the maternal workplace to predict the success or failure of employed mothers to sustain EBF for the first six months of the infant's life.

Breastfeeding-friendly workplaces in the formal sector

This study revealed that workplaces can promote a mother's EBF success for the first six months. This breastfeeding-friendly workplace allows three months of paid maternity leave; gives breaks, space, and facilities for breastfeeding; and allows workmates to take up the tasks of a breastfeeding mother. Of these, lactating mothers who were supported by workmates were 2 times more likely to report EBF than those who were not. The workmates took up tasks while the mother breastfed her baby. Some workmates took care of the baby when the mother worked, words of encouragement, etc. this finding was consistent with a systematic review conducted by (Vilar-Compte *et al.*, 2021) that correlated workmate support with EBF success. This reduced workload allows a mother physical rest, time to bond with her baby, and the ability to produce breast milk to breastfeed her baby. This breastfeeding-friendly environment builds the mother's confidence and determination to EBF success at six months. "*…the environment I am in. I was prepared for the baby. I had a passion for breastfeeding.*" ***˜EBF07.***

This implies that an enabling environment and policies can only enhance a willing mother's ability to continue EBF. That is, a mother with an EBF mind-set will make all adjustments to access and EBF her baby at the workplace. "*I had to get a maid. I hired a particular 'boda-boda' rider from the stage near our home. He used to bring the maid with my baby to breastfeed at my workplace.*" ˜*EBF02*. For example, "*My fourth born was a premature baby of 900 g. I kept the milk in the breast. I had no parties. I did not mind whether the breast was big. After work, the time is his. You have to eat, eat, and eat. I combined my annual leave with maternity leave. I stayed for approximately 8 months.*" ˜ *EBF10*.

The ability of workmate supports to predict EBF success is well known (Chhetri *et al.*, 2018; Ejie *et al.*, 2021; Mwendwa, 2022). This finding is in agreement with a Nairobi study on EBF practices at workplaces (Mwendwa, 2022). Workmate support strengthens mothers' confidence and self-efficacy in continuing EBF while at work, which is consistent with findings from prior studies in India and elsewhere, which suggest that workplaces need to enhance the mother-friendly environment by encouraging and rewarding co-workers and offering the support necessary for breastfeeding workmates (Chhetri *et al.*, 2018; Zhuang *et al.*, 2019).

Surprisingly, a close distance between home and workplace did not statistically significantly predict EBF success. Most (three-quarters) of the mothers lived near their workplace. Some workplaces elicit stress,

"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 up with the bus; early morning hours were truly hard for me to wake up my child to breastfeed. I had to introduce formula milk for him at three months because I had no option." ~EBF04.

Additionally, managers' support, monthly salaries, etc., are not significant in predicting EBF success. This finding was in line with a study conducted by (Lisbona *et al.*, 2020). This affirms that breastfeeding is a social behaviour (Sankar *et al.*, 2023). Thus, mothers with high self-efficacy foster EBF success amidst workplace demand, which is consistent with prior findings (Al-Thubaity *et al.*, 2023). Unlike those in Pakistan, mothers working as nurses and teachers had a similar prevalence of EBF (Ejie *et al.*, 2021; Tangsuksan *et al.*, 2020). Thus, workplaces can promote EBF or interrupt EBF. Healthcare and individual-cognition factors influencing EBF success in the formal sector.

Breastfeeding Friendly Hospital

Breastfeeding-friendly hospitals, promote, and protect EBF. In this study, attending more than four ANC visits correlated EBF success. The study revealed that more ANC visits create an opportunity for mothers to obtain first-hand information on the benefits of EBF from medical experts during health education sessions. During ANC, mothers get the opportunity to interact, share experiences, and learn best practices from peer mothers. This finding is consistent with a study carried out in Saudi Arabia that underscored the importance of health education for mothers at ANC (Nawal & Mawaddah, 2024). This finding is also consistent with surveys that reported that the number of prenatal visits was associated with exclusive breastfeeding (Dalcastagnê *et al.*, 2018; Rahman *et al.*, 2020). In this study, the odds of EBF success for mothers who gave babies prelacteal feeds were 0.23 less likely than those who did not give prelacteal. This finding was consistent with a study conducted by (Neves *et al.*, 2022), who reported that giving babies prelacteal feeds shorten EBF duration, which has a long effect on EBF success.

Conclusion

This study revealed that EBF rate in the formal sector is at 31% which is still low compared to the 60% WHO recommendation. Maternal education levels, social support system at (family and workplace), breastfeeding-friendly hospital interventions (ANC) where associated with EBF. Thus, concurrent interventions directed at promoting: women's further education, basic-financial package for breastfeeding mothers at workplace, strong social support systems (at family, workplace, and healthcare), building maternal EBF mind-set, and implementation of breastfeeding-friendly (hospitals and workplaces) polices would increase EBF in the formal sector.

List of abbreviations

ANC: Antenatal Clinic; AOR: Adjusted odds ratio; CI: Confidence interval(s); 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; WHO: World Health Organization

Declarations

Ethics approval and Consent to participate

Mulago 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

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests in this section.

Funding

The authors did not receive funding support from any organization/agency/institution to conduct this research; this research was self-funded by the author.

Authors' contributions

All authors contributed to the study design. EJ: Developed the study strategy, conducted the study, writing of 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.

Acknowledgements

I thank God for his grace that enabled me to finish this work; I also thank my family for supporting me on this journey of academic success. My votes of thanks also go to all the participants (employed mothers) who offered themselves and participated in this study.

I thank Dr. Juliet Ndibazza for regularly following up on my progress and giving me the necessary support. I equally thank His Grace. Archbishop Paul Ssemwogerere, Rev. Fr. Pontian Kaweesa, Mr. and Mrs. Masaba, Ms. Kentaro Juliet, Mr. Awon Joseph, Rev. Fr. Kayiwa Robert, Rev. Fr. Jude Ssemanda, and Rev. Fr. Cosma Masanga for the financial support towards my Master's program studies; may God bless you for your generosity. I also thank Mr. Kareodu Ronald for providing his professional service of analysing the data used in this work.

Finally, I thank all the lecturers who have been so instrumental in shaping me academically and my classmates for their solidarity and the good times we shared while still on campus.

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Cite this article: Edema J, Charles P. Namisi. (2025). Factors Associated with Successful Exclusive Breastfeeding Among Employed Mothers in the Formal Sector. A Mixed Method Study of Kampala Capital City., *Journal of BioMed Research and Reports*, BioRes Scientia Publishers. 8(1):1-15. DOI: 10.59657/2837-4681.brs.25.171

Article History: **Received:** May 05, 2025 | **Accepted:** May 20, 2025 | **Published:** May 27, 2025