

Using logistic regression analysis to measure the determinants of exclusive breastfeeding in Al-Kharj Governorate in Saudi Arabia

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Abstract

Background: Exclusive breastfeeding (EBF) is the optimal feeding practice for infant health, yet rates remain low worldwide, including in Saudi Arabia

Objective: This study aimed to identify the modifiable factors influencing exclusive breastfeeding among mothers in Al-Kharj, Saudi Arabia.

Methods: This study aimed to identify the modifiable factors influencing exclusive breastfeeding among mothers in Al-Kharj, Saudi Arabia.

Results: The prevalence of EBF was 38%. Strong positive predictors were >3 antenatal visits (AOR 23.8, 95% CI 18–41), previous breastfeeding experience (AOR 16.6, 95% CI 7.0–21.1), colostrum feeding (AOR 7.8, 95% CI 3.8–16.1), husband's support (AOR 6.4, 95% CI 2.6–15.9), rooming-in (AOR 6.2, 95% CI 2.7–14.4), and antenatal breastfeeding education (AOR 6.1, 95% CI 2.8–13.3). Key barriers included perceived insufficient milk (AOR 0.08, 95% CI 0.05–0.13), delayed initiation beyond three days (AOR 0.11, 95% CI 0.04–0.33), returning to work (AOR 0.15, 95% CI 0.08–0.28), prelacteal fluids (AOR 0.28, 95% CI 0.14–0.56), high income (AOR 0.33, 95% CI 0.10–1.09), late baby holding (AOR 0.35, 95% CI 0.13–0.94), and restrictive traditions (AOR 0.37, 95% CI 0.21–0.65).

Conclusions: Modifiable factors such as education, family support, postnatal care, and supportive maternity policies are critical to improve EBF. Findings provide important evidence for policymakers in Saudi Arabia and similar contexts, highlighting the need for healthcare worker training, early initiation and six months of paid maternity leave.

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Title: Using logistic regression analysis to measure the determinants of exclusive breastfeeding in Al-Kharj Governorate in Saudi Arabia

Running Title: Determinants of Exclusive Breastfeeding in Al-Kharj, Saudi Arabia

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Abstract

Background: Exclusive breastfeeding (EBF) is the optimal feeding practice for infant health, yet rates remain low worldwide, including in Saudi Arabia.

Objective: This study aimed to identify the modifiable factors influencing exclusive breastfeeding among mothers in Al-Kharj, Saudi Arabia.

Methods: A cross-sectional study was conducted among 573 mothers at Al-Kharj Maternity and Children's Hospital. Data were collected through structured interviews using a validated questionnaire and analyzed with logistic regression.

Results: The prevalence of EBF was 38%. Strong positive predictors were >3 antenatal visits (AOR 23.8, 95% CI 18–41), previous breastfeeding experience (AOR 16.6, 95% CI 7.0–21.1), colostrum feeding (AOR 7.8, 95% CI 3.8–16.1), husband's support (AOR 6.4, 95% CI 2.6–15.9), rooming-in (AOR 6.2, 95% CI 2.7–14.4), and antenatal breastfeeding education (AOR 6.1, 95% CI 2.8–13.3). Key barriers included perceived insufficient milk (AOR 0.08, 95% CI 0.05–0.13), delayed initiation beyond three days (AOR 0.11, 95% CI 0.04–0.33), returning to work (AOR 0.15, 95% CI 0.08–0.28), prelacteal fluids (AOR 0.28, 95% CI 0.14–0.56), high income (AOR 0.33, 95% CI 0.10–1.09), late baby holding (AOR 0.35, 95% CI 0.13–0.94), and restrictive traditions (AOR 0.37, 95% CI 0.21–0.65).

Conclusion: Modifiable factors such as education, family support, postnatal care, and supportive maternity policies are critical to improve EBF. Findings provide important evidence for policymakers in Saudi Arabia and similar contexts, highlighting the need for healthcare worker training, early initiation and six months of paid maternity leave.

Keywords: Exclusive breastfeeding; Logistic regression; Infant and maternal health; Al-Kharj region.

Introduction

Exclusive breastfeeding (EBF) plays a fundamental role in promoting the health of infants, mothers, and communities. The World Health Organization (WHO) defines EBF as the practice of feeding infants only breast milk during the first six months of life, without any additional food or drink—not even water—except for oral rehydration solutions, vitamins, minerals, and medications when necessary [1]. After this period, complementary foods should be introduced while continuing breastfeeding (BF) until at least two years of age. EBF is widely recognized as the most effective method of infant nutrition due to its extensive short- and long-term health benefits for both children and mothers [2]. Despite this, global EBF prevalence has remained suboptimal over the past two decades. In response, WHO and UNICEF have called for urgent action, introducing a Global Nutrition Target to increase EBF rates to at least 50% by 2025 [3].

In Saudi Arabia, EBF rates remain below WHO recommendations and vary across regions. National estimates reported only 1.7% in 2008 [4], rising to 27.5% by 2016 [5]. In Tabuk, the rate was 31.4% [6], while in Riyadh it reached 13.7% [7]. Although breastfeeding initiation at delivery is high, continuation of EBF for six months declines sharply [8]. The Saudi government has implemented initiatives such as the Baby-Friendly Hospital Initiative (BFHI) to promote, protect, and support breastfeeding [9]. However, rates still fall short of expectations [10].

Previous studies in Saudi Arabia examined maternal attitudes and practices regarding EBF [11-16], reporting substantial deviations from WHO recommendations, with prevalence ranging from 5.3% to 43.9%. No prior study has specifically evaluated EBF in Al-Kharj. Only two studies exist: one at Al-Kharj Military Hospital (2000–2001) reporting breastfeeding rates without calculating EBF [17], and another in 2018 assessing risk factors for breastfeeding cessation [18]. Therefore, this study aims to identify determinants of EBF in Al-Kharj using logistic regression and to highlight modifiable factors influencing continuation up to six months, providing evidence to inform policies and

interventions locally and nationally.

Materials and Methods

This study was conducted in accordance with the Declaration of Helsinki [19], with ethical approval from the Ethics Committee of Prince Sattam bin Abdulaziz University. Confidentiality and anonymity were ensured.

Study setting and participants

A cross-sectional study was conducted at Al-Kharj Maternity and Children's Hospital, Saudi Arabia, between November 2024 and February 2025. Eligible participants were mothers with infants aged 6–24 months.

Inclusion and exclusion criteria

Mothers with children aged 6–24 months were included to evaluate EBF during the critical first six months. Infants younger than six months were excluded, as were mothers or infants with medical conditions such as maternal HIV or infant sucking disorders.

Sampling strategy

A systematic random sampling method was applied. Hospital records indicated approximately 2,300 eligible mothers during the study period. Using a 95% confidence level, 5% margin of error, and 50% prevalence, the required sample size was 573. Every fourth eligible mother was invited until the sample was completed.

Data collection

Data were collected via structured face-to-face interviews using a validated Arabic questionnaire adapted from WHO's BFHI [20]. Responses were cross-checked with hospital records to minimize recall bias.

Questionnaire validity and reliability

Experts in maternal and child health reviewed the questionnaire. The content validity index (CVI) exceeded 0.80, and a pilot test with 47 mothers confirmed clarity. Internal consistency was

acceptable (Cronbach's $\alpha = 0.82$).

Study variables

The dependent variable was EBF, defined as a binary outcome (Yes = exclusively breastfed for six months; No = did not). Independent variables included demographic and socioeconomic factors, actual practices, and knowledge and cultural factors.

Statistical analysis

Data were reviewed for completeness and outliers. Analysis was conducted using SPSS v27.

Descriptive statistics summarized participant characteristics. Variables with $p < 0.20$ in bivariate analyses were entered into multivariable logistic regression. Results are presented as adjusted odds ratios (AORs) with 95% confidence intervals (CIs). Model fit was evaluated using the Hosmer–Lemeshow test, and multicollinearity was assessed via variance inflation factor (VIF) [21,22].

Statistical significance was set at $p < 0.05$.

Results

Participant characteristics

The study included 573 mothers. Most were aged 21–34 years (51.0%), with university-level education for mothers (53.6%) and fathers (50.3%). Most mothers were housewives (72.4%) with middle income (73.3%). Vaginal deliveries were reported in 73.8% of cases, and 85.3% had no chronic illness. Infants were mostly aged 6–12 months (79.1%) with normal birth weight (64.2%), while 36.3% required incubator care (Table 1).

Table 1. Participant characteristics according to demographic and socioeconomic factors in Al-Kharj region, Saudi Arabia.

This table summarizes the demographic and socioeconomic profile of the 573 mothers included in the study, along with their exclusive breastfeeding (EBF) status.

demographic and socioeconomic factors	Total n= 573 n (%)	Exclusive breastfeeding		χ^2 , test p-value
		No (n=355;68%)	Yes (n=218;38%)	
Mother's age (years)				0.499
< 20	144 (25.1)	99 (68.8)	45 (31.3)	

demographic and socioeconomic factors	Total n= 573	Exclusive breastfeeding		χ^2 , test p-value
	n (%)	No (n=355;68%)	Yes (n=218;38%)	
21–34	292 (51.0)	182 (62.3)	110 (37.7)	0.537
≥ 35	137 (23.9)	74 (54.0)	63 (46.0)	
Mother's education				
≤ Primary	37 (6.4)	17 (45.9)	20 (54.1)	0.699
Secondary	229 (40.0)	137 (59.8)	92 (40.2)	
≥ University	307 (53.6)	201 (65.5)	106 (34.5)	
Father's education				0.000*
≤ Primary	28 (4.9)	17 (60.7)	11 (39.3)	
Secondary	257 (44.9)	137 (53.3)	120 (46.7)	
≥ University	288 (50.3)	201 (69.8)	87 (30.2)	0.001*
Mother's occupation				
Housewife	415 (72.4)	282 (68.0)	133 (32.0)	0.061
Employee / student	158 (27.6)	73 (46.2)	85 (53.8)	
Family monthly income (SR)				
< 5000	31 (5.4)	19 (61.3)	12 (38.7)	0.020*
5000–10000	420 (73.3)	268 (63.8)	152 (36.2)	
> 10000	122 (21.3)	68 (55.7)	54 (44.3)	
Mother's chronic illness				0.001*
No	489 (85.3)	299 (61.1)	190 (38.9)	
Yes	84 (14.7)	56 (66.7)	28 (33.3)	
Gestation period (last baby)				0.120
Preterm	114 (19.9)	69 (60.5)	45 (39.5)	
Full-term	459 (80.1)	286 (62.3)	173 (37.7)	
Type of delivery				0.551
Cesarean section	150 (26.2)	95 (63.3)	55 (36.7)	
Vaginal delivery	423 (73.8)	260 (61.5)	163 (38.5)	
Child's birth order				0.267
First	71 (12.4)	33 (46.5)	38 (53.5)	
2nd–3rd	381 (66.5)	242 (63.5)	139 (36.5)	
> 3rd	121 (21.1)	80 (66.1)	41 (33.9)	0.000*
Child's age (months)				
6–12	453 (79.1)	280 (61.8)	173 (38.2)	
13–24	120 (20.9)	75 (62.5)	45 (37.5)	0.000*
Birth weight (kg)				
< 2.5	89 (15.5)	75 (84.3)	14 (15.7)	0.000*
2.5–3.5	388 (64.2)	212 (54.6)	176 (45.4)	
> 3.5	116 (20.3)	79 (68.1)	37 (31.9)	
Infant admitted to nursery				
No	365 (63.7)	225 (61.6)	140 (38.4)	
Yes	208 (36.3)	130 (62.5)	78 (37.5)	

EBF prevalence and practices

The prevalence of exclusive breastfeeding (EBF) was 38.0%, compared with 35.6% for mixed feeding and 26.4% for formula feeding. Certain practices were strongly associated with higher EBF

prevalence, including previous breastfeeding experience (69.1%), colostrum feeding (90.8%), early skin-to-skin contact (76.5%), and rooming-in with the infant (74.0%). Mothers who breastfed more than eight times per day were also substantially more likely to sustain EBF (84.3%). In contrast, several barriers were evident: more than half of the mothers reported giving prelacteal fluids, and common reasons for discontinuing breastfeeding—such as perceived insufficient milk supply, returning to work, and new pregnancy, suggesting that these remain key obstacles. (Table 2)

Table 2. Participant characteristics in study to according to actual practice of EBF in Al-Kharj region, Saudi Arabia

This table presents maternal actual practice of exclusive breastfeeding (EBF).

Independent variable actual practice of EBF	Total n= 573 n (%)	Exclusive breastfeeding		χ^2, test p-value
		No(n=355;68%)	Yes(n=218;38%)	
Feeding type				0.000*
Formula	151 (26.4)	151 (100)	00 (0.0)	
Mixed	204 (35.6)	204 (100)	00 (0.0)	
EBF	218 (38.0)	00 (0.0)	218 (100)	
Previous breastfeeding experience				0.000*
No	204 (35.6)	100 (49.0)	104 (51.0)	
Yes	369 (64.4)	114 (30.9)	255 (69.1)	
Early skin-to-skin contact				0.011*
No	322 (56.2)	163 (50.6)	159 (49.4)	
Yes	251 (43.8)	59 (23.5)	192 (76.5)	
Rooming-in (24h with infant)				0.000*
No	381 (66.5)	213 (55.9)	168 (44.1)	
Yes	192 (33.5)	50 (26.0)	142 (74.0)	
Colostrum feeding				0.000*
No	454 (79.2)	247 (54.4)	207 (45.6)	
Yes	119 (20.8)	11 (9.2)	108 (90.8)	
Time of first holding baby				0.041*
Immediately	82 (14.3)	13 (15.9)	69 (84.1)	
Within 24 hours	268 (46.8)	134 (50.0)	134 (50.0)	
After 24 hours	223 (38.9)	152 (68.2)	71 (31.8)	
Prelacteal fluids before BF				0.000*
No	228 (39.8)	147 (64.5)	81 (35.5)	
Yes	345 (60.2)	208 (60.3)	137 (39.7)	
Birth interval				0.000*
First child	85 (14.8)	63 (74.1)	22 (25.9)	
≥ 24 months	254 (44.3)	103 (40.6)	151 (59.4)	
< 24 months	234 (40.8)	189 (80.8)	45 (19.2)	
Reason to stop EBF				0.000*
Breast issues (Yes)	215 (37.5)	215 (100)	0 (0.0)	

Independent variable actual practice of EBF	Total n= 573	Exclusive breastfeeding		χ^2 , test p-value
	n (%)	No(n=355;68%)	Yes(n=218;38%)	
Insufficient milk (Yes)	309 (53.9)	309 (100)	0 (0.0)	0.000*
Return to work (Yes)	287 (50.1)	287 (100)	0 (0.0)	
New pregnancy (Yes)	321 (56.0)	321 (100)	0 (0.0)	
Number of BF times (24h)				
None	184 (32.1)	184 (100)	0 (0.0)	0.000*
> 8 times	210 (36.6)	33 (15.7)	177 (84.3)	
< 8 times	179 (31.2)	102 (57.0)	77 (43.0)	
Time of BF initiation				
Immediately	177 (30.9)	49 (27.7)	128 (72.3)	0.000*
After three days	314 (54.8)	159 (50.6)	155 (49.4)	
Not BF	82 (14.3)	82 (100)	0 (0.0)	
Accompanied at childbirth				0.154
No	92 (16.91)	71 (77.2)	21 (22.8)	0.154
Yes	481 (83.9)	197 (41.0)	284 (59.0)	

Knowledge and cultural factors

Although 77.1% of mothers were aware of breastfeeding benefits, only 33.3% knew the correct definition of EBF and 30.0% knew the recommended duration, and nearly 80% had never heard of it. Despite more than half of mothers attending over three antenatal visits (53.6%), antenatal and postnatal breastfeeding education were limited (32.8% and 41.7%, respectively), and only 30.2% reported husband support. Cultural traditions hindering breastfeeding were reported by 82.2% (Table 3).

Table 3. Maternal knowledge and attitudes toward exclusive breastfeeding in Al-Kharj region, Saudi Arabia

This table presents the distribution of maternal knowledge and attitudes regarding exclusive breastfeeding (EBF) among the 573 mothers.

Independent variable	Total n= 573	Exclusive breastfeeding		χ^2 , test p-value
	n (%)	No (n=355;68%)	Yes(n=218;38%)	
Husband support				0.000*
No	400 (69.8)	240 (60.0)	160 (40.0)	0.001*
Yes	173 (30.2)	115 (66.5)	58 (33.5)	
Traditions/beliefs hindering EBF				0.001*
No	102 (17.8)	78 (76.5)	24 (23.5)	0.000*
Yes	471 (82.2)	277 (58.8)	194 (41.2)	
Antenatal care (ANC) visits				0.000*
No visit	43 (7.5)	33 (76.7)	10 (23.3)	0.000*
1–3 visits	223 (38.9)	180 (80.7)	43 (19.3)	

Independent variable	Total n= 573 n (%)	Exclusive breastfeeding		χ^2 , test p-value
		No (n=355;68%)	Yes(n=218;38%)	
> 3 visits	307 (53.6)	142 (46.3)	165 (53.7)	
Received antenatal EBF education				0.000*
No	385 (67.2)	225 (58.4)	160 (41.6)	
Yes	188 (32.8)	130 (69.1)	58 (30.9)	
Received postpartum EBF education				0.000*
No	334 (58.3)	193 (57.8)	141 (42.2)	
Yes	239 (41.7)	162 (67.8)	77 (32.2)	
Information source on EBF				0.688
No education	34 (5.9)	21 (61.8)	13 (38.2)	
Health facility	154 (26.9)	100 (64.9)	54 (35.1)	
Other sources	385 (67.2)	234 (60.8)	151 (39.2)	
Ever heard of EBF				0.001*
No	458 (79.9)	265 (57.9)	193 (42.1)	
Yes	115 (20.1)	90 (78.3)	25 (21.7)	
Knowledge of correct EBF duration (6 months)				0.002*
No	401 (70.0)	244 (60.8)	157 (39.2)	
Yes	172 (30.0)	111 (64.5)	61 (35.5)	
Knowledge of EBF definition (breast milk only)				0.003*
No	382 (66.7)	261 (68.3)	121 (31.7)	
Yes	191 (33.3)	94 (49.2)	97 (50.8)	
Awareness of benefits for mother and child				0.007*
No	131 (22.9)	80 (61.1)	51 (38.9)	
Yes	442 (77.1)	275 (62.2)	167 (37.8)	
Heard about Baby-Friendly Hospital Initiative (BFHI)				0.003*
No	331 (57.8)	221 (66.8)	110 (33.2)	
Yes	242 (42.2)	134 (55.4)	108 (44.6)	

Logistic regression models

The models showed good fit and predictive accuracy (Hosmer–Lemeshow $p > 0.05$). Predictive accuracies were 78.0% for sociodemographic, 88.0% for actual practices, and 75.0% for knowledge and cultural factors. (Table 4).

Table 4 Prediction accuracy and goodness-of-fit of logistic regression models assessing.

The table presents classification accuracy, overall predictive accuracy, and Hosmer–Lemeshow test results for models including sociodemographic variables, actual breastfeeding practices, and maternal knowledge and cultural factors.

BF determinants	Size classification accuracy				Predicted accuracy		Fitting the logistic model	
	Observed	EBF			Percentage		χ^2 , test	P-value
The sociodemographic variables	EBF	No	187	61	(75.4)	(78.0)	14.659	.066
		Yes	65	260	(80.0)			

EBF actual practices	EBF	No	219	34	(86.6)	(88.0)	5.992	.648
		Yes	35	285	(89.1)			
Knowledge and culture about EBF	EBF	No	178	70	(71.8)	(75.0)	12.615	.126
		Yes	73	252	(77.5)			

Determinants of EBF

Several factors were significantly associated with exclusive breastfeeding (EBF) practices. The strongest positive predictors were having more than three antenatal care visits (AOR = 23.77; 95% CI: 17.95–41.08; $p < 0.001$), previous breastfeeding experience (AOR = 16.59; 95% CI: 7.03–21.13; $p < 0.001$), and colostrum feeding (AOR = 7.83; 95% CI: 3.81–16.12; $p < 0.001$). Other significant predictors included longer interbirth intervals (AOR = 7.25; 95% CI: 3.50–15.02; $p < 0.001$), rooming-in with the infant (AOR = 6.23; 95% CI: 2.71–14.36; $p < 0.001$), husband's support (AOR = 6.39; 95% CI: 2.57–15.86; $p < 0.001$), and antenatal breastfeeding education (AOR = 6.10; 95% CI: 2.80–13.31; $p < 0.001$). Additional positive factors included frequent breastfeeding (>8 times per day), early initiation of breastfeeding within three days, immediate baby holding, early skin-to-skin contact, awareness of EBF duration and definition, awareness of breastfeeding benefits, hearing about EBF, receiving postnatal breastfeeding education, and awareness of the Baby-Friendly Hospital Initiative (BFHI).

Conversely, several negative predictors were identified. The most significant barriers were perceived insufficient milk (AOR = 0.08; 95% CI: 0.05–0.13; $p < 0.001$), delayed initiation beyond three days (AOR = 0.11; 95% CI: 0.04–0.33; $p < 0.001$), returning to work or study (AOR = 0.15; 95% CI: 0.08–0.28; $p < 0.001$), and giving prelacteal fluids before breastfeeding (AOR = 0.28; 95% CI: 0.14–0.56; $p < 0.001$).

Other notable barriers included high family income (AOR = 0.33; 95% CI: 0.10–1.09; $p = 0.010$), late baby holding after 24 hours (AOR = 0.35; 95% CI: 0.13–0.94; $p = 0.037$), and cultural traditions hindering breastfeeding (AOR = 0.37; 95% CI: 0.21–0.65; $p < 0.001$). Cesarean delivery, infant admission to the nursery, infrequent breastfeeding (<8 times/day), new pregnancy, nipple or breast

problems, and short interbirth intervals (<24 months) were also negatively associated with EBF.

Table 5. Multiple logistic regression analysis of independent predictors of exclusive breastfeeding (EBF) among mothers in Al-Kharj, Saudi Arabia (n = 573).

The table presents adjusted odds ratios (AORs), 95% confidence intervals (CIs), and p-values for sociodemographic, obstetric, breastfeeding practices, knowledge, and cultural factors associated with EBF.

Characteristics	β	AOR	95% CI (Lower – Upper)	P-value
Mother's occupation Employed vs Housewife	-1.700	0.18	0.10–0.33	0.001
Family monthly income (SR)				
5000–10000 vs < 5000	0.823	2.28	1.18–4.41	0.015
>10000 vs < 5000	-1.116	0.33	0.10–1.09	0.010
Gestation period (Full-term vs Pre)	1.035	2.82	1.18–6.74	0.020
Type of delivery (CS vs Vaginal)	-0.976	0.38	0.21–0.68	0.001
Infant admitted to nursery (Yes vs No)	-0.958	0.38	0.23–0.65	0.001
Previous BF experience (Yes vs No)	2.809	16.59	7.03–21.13	0.001
Early skin-to-skin contact (Yes vs No)	0.854	2.35	1.21–4.54	0.011
Rooming-in (Yes vs No)	1.830	6.23	2.71–14.36	0.001
Colostrum feeding (Yes vs No)	2.058	7.83	3.81–16.12	0.001
Initiation to hold baby				
Immediately vs Within 24h	0.865	2.04	0.26–2.53	0.040
After 24h vs Within 24h	-1.048	0.35	0.13–0.94	0.037
Prelacteal fluids (Yes vs No)	-1.280	0.28	0.14–0.56	0.001
Inter-birth interval (months)				
≥ 24 / No previous birth	1.981	7.25	3.50–15.02	0.001
< 24 / No previous birth	-0.986	0.37	0.19–0.72	0.003
Reasons to stop EBF				
Insufficient milk	-2.558	0.08	0.05–0.13	0.001
Return to work/study	-1.917	0.15	0.08–0.28	0.001
New pregnancy	-0.979	0.38	0.19–0.73	0.004
Breast/nipple problems	-0.763	0.47	0.25–0.87	0.016
Number of BF times/24h				
> 8 vs None	1.906	6.72	2.69–16.82	0.001
< 8 vs None	-0.957	0.38	0.17–0.85	0.018
Postpartum BF initiation				
Within 3 days vs Not BF	1.186	3.27	2.70–6.91	0.002
After 3 days vs Not BF	-2.239	0.11	0.04–0.33	0.001
Husband support (Yes vs No)	1.854	6.39	2.57–15.86	0.001
Traditions hindering EBF (Yes vs No)	-1.007	0.37	0.21–0.65	0.001
Antenatal care visits				
1–3 visits vs None	1.735	5.67	1.89–16.99	0.002

Characteristics	β	AOR	95% CI (Lower – Upper)	P-value
> 3 visits vs None	3.169	23.77	17.95–41.08	0.001
Antenatal EBF education (Yes vs No)	1.808	6.10	2.80–13.31	0.001
Postpartum EBF education (Yes vs No)	0.998	2.71	1.66–4.44	0.001
Ever heard of EBF (Yes vs No)	1.055	2.87	1.51–5.46	0.001
Knowledge of EBF duration (Yes vs No)	0.944	2.57	1.40–4.73	0.002
Knowledge of EBF definition (Yes vs No)	0.744	2.11	1.29–3.45	0.003
Awareness of BF benefits (Yes vs No)	0.885	2.42	1.27–4.62	0.007
Heard of BFHI (Yes vs No)	0.735	2.09	1.28–3.40	0.003

Discussion

This study provides novel insights into EBF practices in Al-Kharj, Saudi Arabia. The overall prevalence of EBF was 38%, higher than some regions [23-25] but below the WHO target of 50% by 2025. This highlights persistent challenges in achieving optimal breastfeeding practices despite general awareness. Attending more than three antenatal care visits was the strongest positive predictor, which increased the odds of EBF by nearly 24 times, emphasizing the role of maternal health services. Previous breastfeeding experience, colostrum feeding, rooming-in, and early skin-to-skin contact also positively influenced EBF, consistent with regional studies [26-29]. Husband support further enabled EBF, aligning with both regional and international evidence [30,31]. Conversely, barriers included perceived insufficient milk, delayed initiation, return to work, and prelacteal feeding, reflecting patterns observed in Middle Eastern studies [32,33]. Cesarean delivery, infant nursery admission, and late first holding were also negatively associated with EBF, likely due to disrupted bonding and feeding initiation. Higher family income and cultural traditions hindering breastfeeding compounded these challenges, as reported in prior Saudi studies [33-36]. Maternal age and education were not significant predictors, consistent with some [37,38] but not all studies [39]. These gaps underline the need for structured antenatal and postnatal education and community awareness campaigns.

Strengths and limitations.

Strengths include a large sample (n=573), robust logistic regression analysis, cross-checked interviews, and adherence to the WHO definition of EBF for six months. Collecting data through interviews likely facilitated more accurate recall, and reduced the risk of information bias, which was further minimized by cross-checking against hospital records. Additionally, the questionnaire was carefully designed with clear, specific questions and encompassed all relevant variables. Another notable strength is that it represents the first study conducted in the Al-Kharj region, and only the third in Saudi Arabia [11], [24], to strictly adhere to the WHO definition of EBF for the full initial six months. A key limitation was the relatively short data collection period. Therefore, future research should adopt longitudinal studies to enable more comprehensive follow-up with mothers and infants over time.

Conclusion and recommendations

Most determinants of EBF are modifiable. Efforts should target misconceptions about milk sufficiency, strengthen antenatal/postnatal education, enhance husband support, and ensure supportive maternity policies—particularly a six-month maternity leave—. Implementing the WHO Ten Steps for Successful Breastfeeding [20] and addressing cultural barriers is essential. The findings from the Al-Kharj region carry important implications not only for Saudi Arabia but also for other regions with similar sociodemographic contexts, where targeted interventions could substantially improve infant health outcomes and reduce long-term economic costs. This study provides a comprehensive foundation for future research to further investigate and validate the determinants of exclusive breastfeeding.

Abbreviations and Symbols

BF	Breastfeeding
EBF	Exclusive Breastfeeding
ANC	Antenatal Care
AOR	Adjusted Odds Ratio
CI	Confidence Interval
MCH	Maternity and Children's Hospital

BFHI	Baby-Friendly Hospital Initiative
WHO	World Health Organization
UNICEF	United Nations Children's Fund

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