Neuroendocrinology Letters Volume 44 No. 7 2023
ISSN: 0172-780X; ISSN-L: 0172-780X; Electronic/Online ISSN: 2354-4716
Web of Knowledge / Web of Science: Neuroendocrinol Lett
Pub Med / Medline: Neuro Endocrinol Lett

ORIGINAL ARTICLE

Ever and Exclusive Breastfeeding Practice During the First Six Months of Infants' Life in Bahrain: A Cross-Sectional Study.

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Submitted: 2023-08-29 Accepted: 2023-09-19 Published online: 2023-09-19

Key words: **Bahrain; breast milk; ever breastfeeding; exclusive breastfeeding**

Neuroendocrinol Lett 2023; **44**(7):465–474 **PMID:** 37874558 NEL440723A09

Abstract

OBJECTIVE: This study aimed to determine the prevalence of mothers practicing ever and exclusive breastfeeding for the first six months of life in Bahrain, a high-income country, and determine the variables associated with ever and exclusive breastfeeding.

METHODS: This cross-sectional interview study on breastfeeding patterns was conducted on 345 women attending the Well Baby Clinic during their regular childcare visits at the Bahrain Defense Force Hospital from January 2019 to June 2019. Eligible women had at least one newborn aged six months to two years. The prevalence of ever and exclusive breastfeeding and its associated variables were analyzed using Chi-square and multivariate logistic regression and addressed by the odds ratio (OR) and respective 95% confidence interval (95% CI).

RESULTS: During the first six months of the infant's life, 56% (95% CI: 50.8%-61.5%) of mothers breastfed their infants, but only 5.5% (95% CI: 3.3%-8.5%) practiced exclusive breastfeeding. The multivariate logistic regression results showed that women were less likely to practice ever breastfeeding in the age group of 20-24 years (OR = 0.399, 95% CI: 0.167-0.953, $p < 0.05$) and had low education levels (OR = 0.388, 95% CI: 0.184-0.881, $p < 0.05$). Besides, mothers on contraceptives were not associated with ever breastfeeding (OR=1.926, 95% CI: 1.100-3.373, $p < 0.05$). Furthermore, the multivariate analysis revealed that mothers who had infants born with chronic disease were more likely to exclusively breastfed them (OR = 4.183, 95% CI: 1.138-15.378, $p < 0.05$). On the other hand, a significant association existed between women who did not have antennal care and exclusively breastfeeding (OR = 3.951, 95% CI: 1.460-10.692, $p < 0.01$). Furthermore, the main reason reported by mothers for not ever or exclusively breastfeeding was insufficient breast milk. Besides, difficulty during breastfeeding was another primary reason for not ever breastfeeding.

CONCLUSION: The prevalence of exclusive breastfeeding is very low in Bahrain. To increase the exclusive breastfeeding prevalence rate, education programs and intervention studies, protocols, and training on overcoming mothers' challenges during breastfeeding must be implemented to increase exclusive breastfeeding rates.

INTRODUCTION

Essential nutrients promote health-related quality of life. Fundamentally, newborns and infants are vulnerable to infections and require the most critical nutrients available in their first years of life (WHO 2000; Arifeen *et al.* 2001; WHO 2003). Breast milk offers this key source of the perfect balance of essential nutrients of proteins, fat, carbohydrates, vitamins, and minerals to an infant's growth and development. Furthermore, breast milk enhances infants' immunity through its secretory IgA constituents, enzymes, and bioactive products, against several respiratory, ear, and gastrointestinal infections (WHO 2000; Arifeen *et al.* 2001; WHO 2003; Victora *et al.* 2016; WHO 2009). Besides, breastfeeding lowers infants' chances of developing asthma and allergic reactions and reduces the risk of sudden infant death syndrome (Burr *et al.* 1993; Hauck *et al.* 2011).

It has been estimated that improving breastfeeding rates worldwide could save more than 700,000 lives of infants under 6 months of age (Victora *et al.* 2016). Besides, breastfeeding gives the baby the right amount of weight increase, security, and bonding with the mother. Furthermore, mothers benefit from breastfeeding. Breastfeeding after birth helps the mother release oxytocin, which contracts the uterus and reduces uterine bleeding after childbirth (WHO 2003). In addition, breastfeeding lowers women's risk of developing breast (Anstey *et al.* 2017) and ovarian cancer (Babic *et al.* 2020).

Since breastfeeding is vital for the infants and the mother, the World Health Organization (WHO) has recommended that new mothers initiate breastfeeding within 1 hour of giving birth, then exclusively breastfeed their infants for the first 6 months of life (WHO 2003). Exclusive breastfeeding is defined by infants should only be breastfed from birth to 6 months, and no water, formula, or liquid supplements are given.

Globally, breastfeeding rates remain less enthusiastic than what is required to protect the health of women and children. For instance, it has been estimated that from 2013 to 2018, 44% of mothers exclusively breastfed their infants (Globalbreastfeeding 2022). In the USA, the exclusive breastfeeding percentage for the first 6 months went up from 18.8 to 25.8% from 2011 to 2018 (CDC 2021). However, during the same period, the increase in ever breastfeeding went slightly up from 79.2% to 83.9%. In the Middle East area, exclusive breastfeeding is lower than in the USA and with a wide range (Alzaheb 2017b). In the latter review study, it was reported that exclusive breastfeeding for six months varied between countries and ranged from 2% to 56.4%, with an average of 20.5% from 17 research studies. The lowest percentage was in Kuwait (Dashti *et al.* 2014), whereas the highest was in Iran (Vafaee A 2010).

In Bahrain, the duration of practicing breastfeeding declined from 2 years in the 1960s to 11 months in the 1970s to 8 months in the 1990s (Musaiger 1983; Musaiger & Abdulkhalek 2000). It has been reported that 74% of Bahraini mothers introduced food and liquids early on in an infant's life (Musaiger & Abdulkhalek 2000). In the 1990s, a comprehensive program encouraging breastfeeding was launched, and then Bahrain was part of the World Breastfeeding Trends Initiative (WBTi) (Worldbreastfeeding 2015). As a result, several indicators were introduced through the WBTi as a national policy and program to promote breastfeeding. Consequently, it has been reported that the breastfeeding initiation after delivery is 39.8%, and the exclusive breastfeeding for the first six months rate increased from 7.2 in 2010 to 30% in 2014 (Worldbreastfeeding 2015; Gharib N 2014). However, from our current practice, these numbers seem to be high, and there has been no data on breastfeeding patterns in Bahrain since 2014.

Breastfeeding is more prevalent in low and middle-income countries than in high-income countries (Victora *et al.* 2016). According to the World Bank classifications, Bahrain is a high-income country. Furthermore, practicing ever or exclusive breastfeeding is linked to determinant variables such as maternal age, education, illnesses, employment, parity, infant's condition, and antenatal care (Vafaee A 2010; Alzaheb 2017b; Dashti *et al.* 2014; CDC 2021). However, the association of determinant variables may differ between different cultures or countries, especially between low and middle-income and high-income countries. Therefore, the present study evaluated the prevalence of mothers in Bahrain who breastfed and exclusively breastfed their infants during the first six months. In addition, this study was designed to verify which determinant variable is linked to ever and exclusive breastfeeding during the same period.

PATIENTS AND METHODS

Study design, participants, and setting

A cross-sectional study protocol was designed to interview women with newborns aged from 6 months to 2 years. This study was conducted at the Well Baby Clinic in the Primary Healthcare Department at the Bahrain Defense Force Royal Medical Services (BDF-RMS) from January 2019 to June 2019. BDF-RMS is a tertiary healthcare facility that serves patients throughout the Kingdom of Bahrain. Participants attending the Well Baby Clinic during their regular childcare visits were invited to participate. Each mother was briefed on the study and handed an information sheet about it. Then, the investigator asked if they had questions and would like to participate. Before the interview process began, each participant offered their informed consent.

The inclusion criteria were any woman who had a birth in the past 6 months to 2 years and was willing to answer all questions regarding their breastfeeding

Tab. 1. Characteristics of the mothers and infants in the study

Determinant variable		Frequency	Percentage (%)
Mothers' characteristics			
Mother's Age (years)	< 20	20	5.8
	20-24	113	32.8
	25-29	93	27.0
	30-34	78	22.6
	35 and more	41	11.9
Mother's education	Illiterate	5	1.5
	Primary	84	24.4
	Secondary	156	45.3
	College	99	28.8
Mother's occupation	Housewife	258	74.8
	Worker/business/service	87	25.2
Use of contraceptives	No	268	77.7
	Yes	77	22.3
Antenatal care	No	82	23.8
	Yes	263	76.2
Postnatal care	No	218	63.2
	Yes	127	36.8
Breastfeeding counselling first 2 days of delivery	No	184	53.6
	Yes	159	46.4
Parity	1 child	80	23.3
	2-3 children	168	48.8
	4 and more	96	27.9
Delivery mode of last pregnancy	Vaginal	274	79.9
	Caesarean	69	20.1
Mothers with chronic diseases	No	287	83.4
	Yes	57	16.6
Infants' characteristics			
Birth weight of the last child	Underweight (≤ 2.4 kg)	27	7.8
	Normal weight (2.5-4 kg)	304	88.1
	Overweight (> 4 kg)	14	4.1
Infant's maturity	Term	323	93.6
	Preterm	22	6.4
Infant with chronic disease	No	324	94.5
	Yes	19	5.5
Age of last child	6 months - 1 year	277	80.3
	> 1 year	68	19.7

pattern during the first six months of their infants' lives. In addition, women and their infants should have a minimum of 6 months duration records in the Well Baby Clinic at the BDF hospital. Any woman who did not fit the above criteria and did not understand Arabic or English languages was excluded.

The sample size was determined to be ≥332 based on the birth rates in 2018 in Bahrain, and the estimated proportion of females who exclusively breastfeed their infants (30%) with a 95% confidence interval and 5% margin of error (Worldbreastfeeding 2015; Gharib N 2014).

Interview questionnaire and variables of the study

We have used a similar interview questionnaire as described elsewhere (Al-Hreashy *et al.* 2008). The questionnaire aimed to a) measure the prevalence of practicing ever and exclusive breastfeeding in Bahrain; and b) determine the variables associated with ever and exclusive breastfeeding.

The questionnaire was divided into several parts, including breastfeeding patterns; the demographics of the mothers; the mother's health; the mother's natal care; and the child's health. The breastfeeding pattern was divided into main parts: ever breastfeeding or not during the first 6 months of life, and exclusive breastfeeding is defined by infants who only breastfed for 6 months of life, and no water, formula, or liquid supplements are given.

In the study, the determinant variables in the questionnaire were classified into the mother's age group, educational level, working status, religion, parity, and if the last pregnancy was planned. Besides, questions on the mother's health, such as body mass index (BMI), use of contraceptives, having a chronic disease (s), mode of last delivery, antenatal care, postnatal care, and counseling on breastfeeding within the first 2 days of delivery were included. Furthermore, questions were reported on the last infant's maturity during birth, chronic diseases, and breastfeeding practice during the first six-month period.

Data analysis

The characteristics of the study population were summarized using frequency distributions (prevalence, means, standard deviation, and *p*-value). At the national level, the prevalence of exclusive breastfeeding is categorized as high at >60%, relatively high at 40-59.9%, moderate at 30-39.9%, relatively low at 20-29.9%, and low at < 20% (Bhattacharjee *et al.* 2021; WHO 2022). The questionnaire was validated using Kaiser-Myer-Olkin (KMO > 0.6) and Bartlett test (p <0.000) values on the gathered data. For association analysis, Chi-square analysis was used, and Fisher's exact test was applied when any cells had an expectation of less than 10. Furthermore, all determinant variables in the association analysis of *p*-value less than 0.2 were run in multinomial logistic regression analysis to determine the odds ratio (OR) and respective 95% confidence interval (95% CI). A *p*-value of <0.05 was statistically significant. All analyses were performed using SPSS 25 statistical package.

RESULTS

Mothers' and infants' characteristics

In the present study, 345 mothers participated in the study. The majority of the mothers were between 20 to 24 years of age group (32.8%), had secondary education (45.3%), were housewives (74.8%), did not use contraceptives (77.7%), had 2-3 children (48.8%), and had no chronic illnesses (83.4%) (Table 1). During their last pregnancy, the majority of the mothers had antenatal care (76.2%) but not postnatal care (63.2%) or breastfeeding counseling (53.6%). On the other hand, most mothers' infants had normal BMI (88.1%), had full-term pregnancy (93.6%), did not suffer from chronic disease (94.5%), and their age was between 6 months to 1 year (80.3%) (Table 1).

Prevalence of ever and exclusive breastfeeding in Bahrain

The prevalence of ever breastfeeding during the first six months of life in Bahrain was 56% (95% CI: 50.8%-61.5%) (Table 2). However, more than 60% of these breastfeeding mothers included formula milk in their infant's diet. Besides, about 40% of breastfeeding women who did not use formula milk had either whole milk or solid food, dropping the percentage for exclusive breastfeeding to 5.5% (95% CI: 3.3%-8.5%) (Table 2).

The reasons reported by mothers for not ever breastfeeding were insufficient breast milk (28.5%), difficulty breastfeeding (27.8%), mother sickness (9.9%), working mothers (6%), sick infants (4.6%), and pregnancy (3.3%). The difficulty breastfeeding was either improper latch on, sore or inverted nipples. On the other hand, mother sickness (9.9%), working mothers (6%), sick infants (4.6%), and pregnancy (3.3%) were minor reasons for not ever breastfeeding.

The primary reasons reported by the mothers for not exclusive breastfeeding were insufficient breast milk (41.9%) and work (20.5%). On the other hand, difficulty breastfeeding (7.7%) and pregnancy (7.7%) were minor reasons for not exclusive breastfeeding.

Older age, high education, and not using contraceptives are positive determinants for breastfeeding in Bahrain

The associations between breastfeeding and common variables showed that education ($p < 0.05$), use of contraceptives ($p < 0.05$) and birth weight of the last child ($p < 0.05$) were significantly linked to ever breastfeeding (Table 3). The multivariate logistic regression results showed that the women's age group of 20-24 years (OR = 0.399, 95% CI: 0.167-0.953, $p < 0.05$) and low education level (OR = 0.388, 95% CI: 0.184-0.881, $p < 0.05$) were less associated with ever breastfeeding.

Tab. 2. Pattern of nutritional practice during the first six months of life.

Breast milk	Formula milk	Whole milk	Liquids/Solid Food	Solid food	N	%	Case summary
Breast milk (194)	Formula Milk (117)	Whole milk (22)	Other liquids	Solid food	22	6.4	Breast milk, formula milk, whole milk, and solid food
				No Solid food	0	0	
			No other liquids	Solid food	0	0	
				No solid food	0	0	
		No whole milk (95)	Other liquids	Solid food	66	19.1	Breast milk, formula milk, other liquids and solid food
				No solid food	5	1.4	Breast milk, formula milk and other liquids
			No other liquids	Solid food	1	0.3	Breast milk, formula milk and solid food
				No solid food	23	6.7	Breast milk and formula milk
	No formula milk (77)	Whole milk (15)	Other liquids	Solid food	15	4.3	Breast milk, whole milk, other liquids and solid food
				No solid food	0	0	
			No other liquids	Solid food	0	0	
				No solid food	0	0	
		No whole milk (62)	Other liquids	Solid food	41	11.9	Breast milk, other liquids and solid food
				No solid food	1	0.3	Breast milk and other liquids
			No other liquids	Solid food	1	0.3	Breast milk and solid food
				No solid food	19	5.5	Breast milk
No breast milk (151)	Formula Milk (146)	Whole milk (36)	Other liquids	Solid food	34	9.9	Formula milk, whole milk, other liquids and solid food
				No solid food	0	0	
			No other liquids	Solid food	1	0.3	Formula milk, whole milk and solid food
				No solid food	1	0.3	Formula milk and whole milk
		No whole milk (110)	Other liquids	Solid food	75	21.7	Formula milk, other liquids and solid food
				No solid food	8	2.3	Formula milk and other liquids
			No other liquids	Solid food	3	0.9	Formula milk and solid food
				No solid food	24	7	Formula milk
	No formula milk (5)	Whole milk (4)	Other liquids	Solid food	1	0.3	Whole milk, other liquids and solid food
				No solid food	1	0.3	Whole milk and other liquids
			No other liquids	Solid food	0	0	
				No solid food	2	0.6	Whole milk
		No whole milk (1)	Other liquids	Solid food	1	0.3	Other liquids and solid food
				No solid food	0	0	
			No other liquids	Solid food	0	0	
				No solid food	0	0	

Tab. 3. Determinant variables associated with breastfeeding*

Determinant variables		Breastfeeding N (%)		*p*-value**
		Never	Ever	
Age (years)	< 20	10 (50%)	10 (50%)	0.186
	20-24	57 (50.4%)	56 (49.6%)	
	25-29	38 (50.9%	55 (59.1%)	
	30-34	34 (43.6%)	44 (56.4%)	
	35 and more	12 (29.3%)	29 (70.7%)	
Antenatal care	No	42 (51.2%)	40 (48.8%)	0.128
	Yes	109 (41.4%)	154 (58.6%)	
BMI	Underweight	8 (72.7 %)	3 (27.3%)	0.082
	Normal weight	91 (46%)	107 (54.0%)	
	Overweight	42 (36.5%)	73 (63.5%)	
	Obese	10 (47.6%)	11 (52.4%)	
Contraceptives	No	109 (40.7%)	159 (59.3%)	<0.05
	Yes	42 (54.5%)	35 (45.5%)	
Education	Illiterate	3 (60.0%)	2 (40.0%)	<0.05
	Primary	45 (53.6%)	39 (46.4%)	
	Secondary	71 (45.5%)	85 (54.5%)	
	College	31 (31.3%)	68 (68.7%)	
Delivery mode of last child	Vaginal	115 (42%)	159 (58%)	0.137
	Caesarean	36 (52.2%)	33 (47.8%	
Religion	Muslim	148 (44.8%)	182 (55.2)	0.103
	Non-Muslim	3 (21.4%	11 (78.6%)	
Nationality	Bahraini	66 (48.5%)	70 (51.5%)	0.183
	Non-Bahraini	85 (40.7%)	124 (59.3%)	
Birth weight of the last child	Underweight (< 2.4 kg)	19 (70.4%)	8 (29.6%)	<0.05
	Normal weight (2.5-4 kg)	127 (41.8%)	177 (58.2%)	
	Overweight (> 4 kg)	5 (35.7%)	9 (64.3%)	
Infant's maturity	Term	137(42.4%)	186 (57.6%)	0.052
	Preterm	14 (63.6%)	8 (36.4%)	

* The variables presented here were those of p value less than 0.2 determined from the association analysis.
**Chi-square test and Fisher's exact test were used depending on the situation.

On the other hand, mothers who were not on contraceptives were associated with ever breastfeeding (OR = 1.926, 95% CI: 1.100-3.373, $p < 0.05$) (Table 4).

No antenatal care and Infants with chronic disease are positive determinants for exclusive breastfeeding in Bahrain

The prevalence of exclusive breastfeeding was very low (5.5%). Surprisingly, exclusive breastfeeding was found to be associated with women who did not have antenatal care ($p < 0.001$) (Table 5). Besides, exclusive breastfeeding was associated with infants born with chronic disease ($p < 0.05$). Furthermore, the multivariate analysis revealed that mothers who had infants born with chronic disease were more likely to exclusively breastfed them (OR = 4.183, 95% CI: 1.138-15.378, $p < 0.05$). On the other hand, a significant association existed between women who did not have antennal care and exclusively breastfeeding was apparent (OR 3.951, 95% CI 1.460-10.692, $p < 0.01$) (Table 6).

DISCUSSION

The present study demonstrated a moderate prevalence of mothers who breastfed their infants but a very low prevalence of exclusive breastfeeding (Bhattacharjee *et al.* 2021; WHO 2022). These percentages are significantly lower than the target set by the

Tab. 4. Multivariate regression analysis between several determinant variables and ever breastfeeding

Determinant variables		OR	95% CI	*p*-value
Age (years)	< 20	0.483	0.140 - 1.661	0.248
	20-24	0.399	0.167 – 0.953	<0.05
	25-29	0.558	0.232 - 1.345	0.194
	30-34	0.496	0.205 - 1.201	0.120
	35 and more	Ref	Ref	Ref
Antenatal care	No	0.819	0.475 - 1.411	0.472
	Yes	Ref	Ref	Ref
BMI	Underweight	0.393	0.089 – 1.709	0.212
	Normal weight	Ref	Ref	Ref
	Overweight	1.190	0.712 – 1.989	0.506
	Obese	1.014	0.372 – 2.739	0.986
Contraceptives	No	1.926	1.100- 3.373	<0.05
	Yes	Ref	Ref	Ref
Education	Illiterate + Primary*	0.388	0.184 – 0.881	<0.05
	Secondary	0.625	0.342 – 1.143	0.13
	College	Ref	Ref	Ref
Delivery mode of the last Child	Caesarean	0.619	0.337 – 1.136	0.122
	Vaginal	Ref	Ref	Ref
Nationality	Bahraini	0.593	0.346 – 1.008	0.053
	Non-Bahraini	Ref	Ref	Ref
Religion	Muslim	0.540	0.229 – 1.310	0.416
	Non-Muslim	Ref	Ref	Ref
Infant's maturity	Term	1.094	0.307 – 3.891	0.890
	Preterm	Ref	Ref	Ref
Birth weight of last child	Underweight (< 2.4 kg)	0.353	0.107 – 1.166	0.088
	Normal weight (2.5-4 kg)	1.485	0.443 – 4.976	0.521
	Overweight (> 4 kg)	Ref	Ref	Ref

*Due to low number, illiterate women were combined with women who received primary education

WHO, and those numbers were reported in Bahrain in 2014 (Gharib N 2014; CDC 2021). Furthermore, these percentages are lower than in high-income countries (Victora *et al.* 2016; CDC 2021; Vaz *et al.* 2021; Neves *et al.* 2022; Zielińska *et al.* 2017). Besides, exclusive breastfeeding was lower than those from the same surrounding Middle Eastern countries such as Turkey (38.9%) (Yılmaz *et al.* 2017), or Iran (53%) (Behzadifar *et al.* 2019), but higher than Kuwait (2%) (Dashti *et al.* 2014), and the United Arab Emirates (1.9%) (Radwan 2013). In a recent analytic review, it has been reported that most of the children (median prevalence equals to 91%) were ever breastfed in high-income countries. However, exclusive breastfeeding at six months declined, reaching a median prevalence of 18%, suggesting that a longer duration of breastfeeding is not valued in several high-income countries (Vaz *et al.* 2021).

The determinant variables in the present study that were associated with ever breastfeeding were different from those related to exclusive breastfeeding. Mothers with younger ages, low education levels, using contraceptives, and underweight infants were associated with not ever breastfeeding. In contrast, mothers having antenatal care were associated with not exclusive breastfeeding. However, infants' health was of concern to mothers, whereby infants with a chronic disease were determined variable for exclusive breastfeeding.

Tab. 5. Determinant variables associated with exclusive breastfeeding

Variable		Breastfeeding N (%)		*p*-value
		No	Yes	
Antenatal care	No	71 (88.6%)	11 (13.4%)	<0.001
	Yes	255 (97.0%)	8 (3.3%)	
Contraceptives	No	250 (93.3%)	18 (6.7%)	0.087
	Yes	76 (98.7%)	1 (1.3%)	
Infant born with chronic disease	No	310 (95.7%)	14 (4.3%)	<0.05
	Yes	15 (78.9%)	4 (21.1%)	

* The variables presented here were those of p value less than 0.2 determined from the association analysis.
**Chi-square test and Fisher's exact test were used depending on the situation.

Tab. 6. Multivariate regression analysis between several determinant variables and exclusively breastfeeding

Determinant variables		OR	95% Confidence	*p*-value
Antenatal care	No	3.951	1.460 – 10.692	<0.01
	Yes	Ref	Ref	Ref
Contraceptives	No	4.718	0.609 – 36.571	0.136
	Yes	Ref	Ref	Ref
Infant with chronic disease	Yes	4.183	1.138 – 15.378	<0.05
	No	Ref	Ref	Ref

Several studies have shown that low education was a common determinant variable for not breastfeeding (Yılmaz *et al.* 2017; Dashti *et al.* 2014; Radwan 2013). Besides, other studies have reported that low education was a determinant factor in ceasing breastfeeding (Hauck *et al.* 2011). However, although education is a determinant variable for breastfeeding, education level did not appear to be essential for exclusive breastfeeding (Hagos & Tadesse 2020; Alzaheb 2017a; Al Ghwass & Ahmed 2011). For instance, education level was not related to emotional response, attitude, or behavioral intention to exclusive breastfeeding (Alzaheb 2017a). Besides, low education with low household income was associated with a longer duration of breastfeeding, suggesting such combination determinants may have a different driving force for exclusive breastfeeding (Ayesha *et al.* 2021; Islam *et al.* 2018). Furthermore, exclusive breastfeeding varied widely in a mapping study in low- and middle-income countries based on poverty, education, and fertility (Bhattacharjee *et al.* 2021). However, most low- and middle-income countries have high exclusive breastfeeding prevalence and are predicted to reach the WHO's Global Nutrition Target projected percentage of bigger or equal to 70% by 2030 (Bhattacharjee *et al.* 2021).

Some studies reported that younger age is another determinant variable to cease breastfeeding by 9 weeks or less in countries with a high gross domestic product (GDP), similar to Bahrain (Hauck *et al.* 2011; Radwan 2013). However, in the present study, younger age was associated with not breastfeeding. One of the reasons is that younger mothers are strongly influenced by their partners, mothers, and peers, and therefore their belief in breastfeeding depends on the information they get (Noble-Carr & Bell 2012). Therefore, providing accessible breastfeeding information after delivery to younger mothers is essential to enhance breastfeeding practice (Noble-Carr & Bell 2012).

In the present study, antenatal care was a negative determinant variable of exclusive breastfeeding. It has been reported that mothers who did not have antenatal care had a longer duration of breastfeeding than mothers who did have antenatal care (Ayesha *et al.* 2021). On the other hand, other studies have shown that antenatal care had a positive determinant for exclusive breastfeeding (Al Ghwass & Ahmed 2011; Nabunya *et al.* 2020). Furthermore, in the present study, underweight infants or infants with a chronic condition were associated with not being breastfed or exclusively breastfed, respectively. In the first condition, mothers go to bottle-feeding to increase infants' weight faster. In contrast, in the latter, when their infant has a chronic disease, mothers may exclusively breastfeed due to the information they receive that breastfeeding would help their baby's health.

The primary reasons that led the mothers not to ever breastfeed were due to insufficient breastmilk and difficulty during breastfeeding. Besides, insufficient breast milk was the primary reason for not exclusive breastfeeding. These are common issues that mothers face during breastfeeding. Furthermore, when mothers encounter such problems and have insufficient knowledge and skills, they stop breastfeeding and/or exclusive

breastfeeding in the early postpartum period (Noble-Carr & Bell 2012). However, with proper training and eating habits during lactation, these issues should not be a factor. It has been established that mothers who received training before and during pregnancy have higher knowledge, attitudes, and behavior towards practicing exclusive breastfeeding (Radwan 2013; Wood *et al.* 2016; Renfrew *et al.* 2012). Furthermore, two recent clinical trials have shown that skilled antenatal breastfeeding education and postnatal lactation intervention increased breastfeeding rates and exclusive breastfeeding patterns (Gupta *et al.* 2019; Huang *et al.* 2019).

The present study has limitations. Firstly, it is a cross-sectional study based on a collection of retrospective data, and therefore, results were analyzed as hypothetical associated determinants rather than cause and effect. Secondly, although enough time during the interview was given to each mother to answer each question, the answers depended on the mothers recalling the breastfeeding practice during the first six months. Thirdly, the present study did not measure the duration of exclusive breastfeeding during the six-month period. These limitations should help properly design studies to evaluate breastfeeding practices in Bahrain thoroughly.

CONCLUSION

The present study showed a very low prevalence of exclusive breastfeeding in Bahrain; therefore, some strategies must be implemented. These strategies are: (i) promote training among health professionals highlighting the importance of disseminating information related to exclusive breastfeeding and its maintenance up to two years of age during antenatal care; (ii) increase breastfeeding knowledge and skills intervention during early postpartum and enhance the maternal perception of infant behavior; (iii) highlight and financially encourage hospitals with baby-friendly initiatives; and (iv) carry out more intervention studies, protocols, and training on overcoming mothers' challenges during breastfeeding.

DECLARATIONS

Ethics approval and consent to participate

The investigator submitted the protocol to the Research & Research Ethics Committee at the Royal Services of Bahrain Defense Force (BDF) Military Hospital and received approval (BDF/R&REC/2018-324). After a briefing about the study and the study purpose, the investigator asked if each participant was willing to participate. When verbal informed consent was achieved, the investigator began the questionnaire.

Consent for publication

All participants consented to publish their answers without breaching their consent.

Authors Contribution

FN conceived the study. FN and SM contributed to data collection, analysis, and interpretation. FN drafted the manuscript, and SM reviewed the manuscript. Both authors read and approved the final draft of the manuscript.

Funding

The authors declare that they did not receive funding for this research project.

Competing Interests

The authors declare no conflict of interest.

Availability of data and materials

The datasets used for analysis are available from the corresponding author on reasonable request.

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