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Factors Influencing Saudi Mothers' Success in Exclusive Breastfeeding for the First Six Months of Infant Life: A Cross-Sectional Observational Study

Nada A Alyousefi[1*], Ashwag A Alharbi[2], Bayan A Almugheerah[2], Nourah A Alajmi[2], Seham M Alaiyashi[2], Shroog S Alharbi[2] and Zaheah K Alnoumasi[1]

[1] *Department of Family and Community Medicine, College of Medicine, King Saud University, Saudi Arabia*

[2] *College of Medicine, King Saud University, Saudi Arabia*

**Corresponding e-mail: nalyousefi@ksu.edu.sa*

ABSTRACT

Introduction: *Although breastfeeding has been shown to have dual benefits for both infants and their mothers, the global rate of breastfeeding has been declining, especially in Middle Eastern countries. This decline necessitates an urgent exploration of the determinants of breastfeeding practices.* ***Objectives:*** *This study was conducted to evaluate the breastfeeding practices of Saudi mothers, compare them to the guidelines and recommendations of the World Health Organization and to examine the possible determinants of success in exclusive breastfeeding for the first six months of life.* ***Methods:*** *A quantitative observational cross-sectional study was conducted in 322 selected mothers of children between 6 months and 24 months of age who attended the well-baby clinic at King Saud University Medical City, Riyadh (2015).* ***Results:*** *Although 94.4% of the 322 Saudi mothers were successful in initiating breastfeeding on the first day of delivery, only 13.7% of all infants were exclusively breastfed at the age of 6 months. Factors predicting exclusive breastfeeding for the first six months of life in the study sample were previous experience with exclusive breastfeeding and the intention to exclusively breastfeed. In addition, the frequency of breastfeeding on demand at day and night was found to be significant. Sources of breastfeeding support are of great concern.* ***Conclusion:*** *The majority of Saudi mothers have suboptimal breastfeeding practices. A cohort study enrolling a larger number of exclusively breastfed infants is needed to gain a full understanding, as are actions to bridge the gap between current breastfeeding practices and the World Health Organization recommendations.*

Keywords: Breastfeeding, Saudi mothers, World health organization recommendations

INTRODUCTION

Breastfeeding simultaneously provides nutrition, health, and care to infants, and consequently, the World Health Organization (WHO) recommends practicing exclusive breastfeeding [1]. To help mothers establish and sustain exclusive breastfeeding (EBF) for six months, the WHO and UNICEF recommend initiating breastfeeding within the first hour of life, breastfeeding on demand and not using bottles, teats, or pacifiers [2]. Breastfeeding has dual benefits for both the infant and their mothers, providing protection against many health conditions [3].

For infants, the colostrum (first feed) encourages the immune system and facilitates passage of the first stool (the meconium) [4]. As for long-term infant health effects, serious colds and ear and throat infections have been shown to be reduced by 63% in infants who exclusively breastfeed for six months [5]. Additionally, more than 900 infant lives per year may be saved from sudden infant death syndrome (SIDS) in the United States if 90% of mothers exclusively

breastfeed for six months [6]. There is a protective effect of exclusive breastfeeding for 3 to 4 months in reducing the incidence of clinical asthma, atopic dermatitis, and eczema by 27% in a low-risk population and up to 42% of infants with a positive family history [7].

The benefits of breastfeeding may extend into adult life. For example, adult participants in the Framingham Offspring study who were breastfed were found to have a lower BMI and higher concentrations of high-density lipoprotein [8]. Furthermore, the duration of breastfeeding is inversely related to the risk of over-weight; each month of breastfeeding is associated with a 4% reduction in risk [9]. Additionally, breastfeeding may be associated with a reduction in leukaemia, and this reduction is correlated with the duration of breastfeeding [9,10]. Higher intelligence scores are noted in infants who exclusively breastfeed for three months or longer [3]. Significant positive effects of human milk feeding on long-term neurodevelopment are observed in preterm infants [11].

Mothers who breastfeed may gain both short and long-term health benefits, such as decreased postpartum blood loss and more rapid involution of the uterus. Continued breastfeeding leads to increased child spacing secondary to lactational amenorrhea [3]. In addition, breastfeed can provide protection from postpartum depression; prospective cohort studies have noted an increase in postpartum depression in mothers who do not breastfeed or who wean early [12].

Despite the positive effects of breastfeeding, we continue to observe a percentage of late initiation and a significant decline in the prevalence of exclusive breastfeeding in Saudi Arabia. The rate of breastfeeding in the first hour of life is only 11.4%. One study in Saudi Arabia showed that 90% of women in the rural area had an early initiation of breastfeeding compared to 76% in the urban area [13]. One study noted that "The 'mean breastfeeding duration' in Saudi Arabia was as high as 13.4 months in 1987; it has dropped to only 6.8 months in 1999 and 8.5 months in 2010" [14]. A study conducted in Taif, a small city in Saudi Arabia, found that the prevalence of exclusive breastfeeding at less than one month of age was only 30.3% [15]. Only 24.4% of infants were exclusively breastfed at the age of 6 months in Al-Hassa [16].

The low prevalence of exclusive breastfeeding is not a local issue; the mean rate of 'exclusive breastfeeding' at four months in the middle-eastern countries is (24%), including Lebanon (7%), Yemen (15%), Pakistan (16%), Jordan (32%) and Iran (48%) [17]. Low rates at six months have also been noted in Algeria (6.9%), Sudan (15.6%) and Egypt (30.3%) [14]. Only 26.5% of the mothers had continued breastfeeding for six months or more in Kuwait [18].

Several observational studies have been conducted to explore the factors associated with successful breastfeeding. A study conducted in Ireland found that mothers with a high level of education were most likely to breastfeed their children [19]. Mothers who have a previous successful experience with breastfeeding want to breastfeed again [19]. A study in Tehran found that the most effective factor that positively influenced exclusive breastfeeding was feeding infants more than eight times per day [20].

There are some published data from the Gulf countries. The most common factors affecting the continuation of breastfeeding are the use of contraceptives and the frequency of breastfeeding during the night, from 4 to 6 times, according to an Emirati study [21]. In Kuwait, father's encouragement was an important factor in increasing the duration of breastfeeding and delayed the early cessation of breastfeeding [18].

On the other hand, some factors significantly influence early cessation. In Kuwait, separate family housing, higher maternal age, late initiation of breastfeeding, employment without the ability to breastfeed at work, provision of breastfeeding information after rather than before birth, and maternal and infant sickness were all associated with unsuccessful breastfeeding experiences [18].

There are many benefits of breastfeeding for both the mother and the infant, and there are many factors that influence compliance to an exclusive breastfeeding regimen. It is currently unknown how many Saudi mothers exclusively breastfeed their children, and the factors that influence mothers to breastfeed exclusively are also unclear. Therefore, this study was conducted to evaluate the breastfeeding practices of Saudi mothers, compare their practices with the guidelines and recommendations of the WHO and to examine the possible determinants of success in the initiation and continuation of breastfeeding for the first six months of life.

METHODS

Setting and design

A quantitative observational cross-sectional study was conducted in Well-Baby Clinics at King Saud University Medical City (KSUMC) in Riyadh between February 8 and March 12, 2015. KSUMC is one of the largest general governmental hospitals in Riyadh that offers medical health services to the population of the central region of Saudi Arabia. The Well-Baby Clinics are governmental clinics that provide free child health services for children, mainly infant vaccination programmes.

Participants

Eligible mothers were Saudi residents who spoke Arabic, had an infant between 6 months and two years of age and who presented to the Well-Baby Clinic at KSUMC. All eligible mothers agreed to participate. After obtaining verbal informed consent, each eligible mother completed a questionnaire. The questionnaire was conducted by researchers via a face-to-face interview to ensure understanding. The completeness of the questionnaire was checked.

Sampling

Considering the total number of registered 6-month-old to 24-month-old infants at KSUMC well-baby clinics and a previously published prevalence of exclusive breastfeeding in Saudi Arabia of 24.4%, [16] the sample size was calculated assuming the lowest acceptable prevalence of 20% and an alpha level of 0.05. The total sample size was thus calculated to require 322 infants.

Questionnaire

The pretested questionnaire was developed by the authors based on an extensive literature review [14,16,18,20,22-25] and was used to obtain demographic information such as mother's age, father's and mother's employment status, educational level, residence, income, chronic illnesses, and smoking status.

Information about the infants was collected from infants' medical records and included infants' age, gestational age, sex, type of delivery, weight at delivery, and any complication or admission of the infant after delivery.

The outcome variables were mainly used to identify the feeding patterns in the first six months of the infants' life. The outcome variable (exclusive breastfeeding) was expressed as the proportion of infants who were exclusively breastfed at the age of 6 months. The definition of exclusive breastfeeding used was "infants who were only breastfed since birth; no water, formula or liquid supplement" [26].

The survey asked about three breastfeeding patterns [27,28]

Exclusive breastfeeding (EBF): Breastfeeding only, with no other food or liquid, including water, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicine. This definition meant that the infant did not receive any type of prelacteal food or supplementary food.

Mixed feeding: The infant was fed with breast milk, infant formula, and/or other types of food.

Exclusive infant formula feeding: The infant was fed with infant formula, but not any breast milk.

The mothers were asked whether and how often they breastfed their infants at night, roomed in, used pacifiers, bottles, or breast pumps, used drugs or herbs to help milk flow and used contraception. They were also asked about their intention to breastfeed their infants (pre-planned) and previous successful experience with exclusive breastfeeding. The survey also explored the sources of mothers' information and motivation for breastfeeding as a possible factor that could influence their plans and practice.

Pilot study

The questionnaire was tested on 10 Saudi mothers from the target population. Four breastfeeding specialists also reviewed the questionnaire, and their comments were considered. After their review, a series of modifications were performed to the questionnaire in the form of re-wording only. The estimated average time of completion was 15 minutes.

Ethical consideration

Ethical approval was obtained from the institutional review board (IRB) of the College of Medicine at King Saud University. The consent form was attached to the IRB application. We assured the participants that all answers given would be strictly confidential and used for research purposes only. No competing financial interests exist.

Statistical methods

Quantitative data were entered, coded, and analysed using Statistical Package for Social Sciences software (SPSS Inc. version 21, Chicago, Illinois). Descriptive statistics were computed to determine the prevalence of exclusive breastfeeding. Proportions were compared by exclusive breastfeeding (EBF) and non-exclusive breastfeeding (not-EBF) using Pearson's chi-square test of independence and binary logistic regression analysis. The factors included were mother's age, education level, family income, employment status, contraceptive use, order of the child, delivery type, gestation, weight of infant at birth, type of hospital, infant complication after delivery, infant hospital admission after delivery, mother's complications during pregnancy, mother's complications after birth, time of planning for breastfeeding, mother's plan for breastfeeding, availability of formula feed in the hospital and place of residence. The model also included breastfeeding practices such as times of breastfeeding during the day and night and use of a method to increase lactation (herbs, medication, and breast pump). Sources of education and support regarding the mother's decision to breastfeed were included in the analysis.

To identify the independently associated factors, all variables that were significant in the binary logistic regression analysis were entered into the multivariate logistic regression to determine the independent predictors of initiation and of exclusive breastfeeding. All tests were two-sided, and $p<0.05$ was considered statistically significant. The variables included in the regression models were as follows: the mother's previous experience with breastfeeding, the mother's breastfeeding plan, the practice of breastfeeding upon demands at day and the frequency of night feeding.

RESULTS

Demographic characteristics

Table 1 shows the demographic characteristics of the study population. A total of 322 infants (6-24 months in age), 55% male and 45% female, were included. More than half of the infants were born with a birth weight between 2.5 kg and 3 kg. Approximately 75% of infants were delivered by normal vaginal delivery (241), and 25.2% were delivered by caesarean section.

A third of studied mothers, 103 (32%), were in the 26-30 age group. Approximately half of the mothers had graduated from a college (49.4%). Most of them lived in a city (96%). Thirty-two percent were employed. Regarding health status, only 14% had a chronic illness. The most commonly reported illnesses were diabetes, hypertension, hyperlipidaemia, hypothyroidism, anaemia and bronchial asthma. Most of the mothers were multiparous (69.5%) and housewives (59%). More than half of the participants did not use contraception (52.5%).

Table 1 Sociodemographic and health-related characteristics and practices of the sample in relation to exclusive breastfeeding for the first six months of infant life and its influencing factors in Riyadh, Saudi Arabia (2015)

Variables		Total Number (%)	Exclusive Breastfeeding (EBF) Number (%)	Non-Exclusive Breastfeeding (NEBF) Number (%)	p-value
Overall		322 (100)	44 (13.7)	278 (86.3)	-
Mother's Age	<20	4 (1.2)	0 (0)	4 (1.2)	0.832
	20-25	80 (24.8)	13 (4.0)	67 (20.8)	
	26-30	103 (32.0)	12 (3.7)	91 (28.3)	
	31-35	84 (26.1)	12 (3.7)	72 (22.4)	
	>35	51 (15.8)	7 (2.2)	44 (13.6)	

Mother's Education Level	Uneducated	8 (2.5)	3 (0.9)	5 (1.6)	0.293
	Primary School	16 (5)	0 (0)	16 (5)	
	Intermediate School	15 (4.7)	3 (0.9)	12 (3.8)	
	Secondary School	103 (32)	15 (4.7)	88 (27.3)	
	College Graduate	159 (49.4)	20 (6.2)	139 (43.2)	
	Post-Graduate	21 (6.4)	3 (0.9)	18 (5.5)	
Mother's Chronic Illness	Yes	46 (14.3)	6 (1.9)	40 (12.4)	0.555
	No	276 (85.7)	38 (11.8)	238 (73.9)	
Mother's Occupation	Student	27 (8.4)	3 (0.9)	24 (7.5)	0.41
	Employee	105 (32.6)	11 (3.4)	94 (29.2)	
	Housewife	190 (59)	30 (9.3)	160 (49.7)	
Monthly Family Income	<5000 Saudi Riyals	53 (16.5)	8 (2.5)	45 (14)	0.295
	5000-10,000 Saudi Riyals	174 (54)	23 (7.1)	151 (46.9)	
	11,000-15,000 Saudi Riyals	59 (18.3)	5 (1.6)	54 (16.7)	
	>15,000 Saudi Riyals	36 (11.2)	8 (2.5)	28 (8.7)	
Use of Contraception	Yes	153 (47.5)	17 (5.3)	136 (42.2)	0.134
	No	169 (52.5)	27 (8.4)	142 (44.1)	
Delivery Type	Vaginal Delivery	241 (74.8)	32 (9.9)	209 (64.9)	0.427
	Caesarean Delivery	81 (25.2)	12 (3.7)	69 (21.5)	
Maternal Complication During Pregnancy	Yes	63 (19.6)	9 (2.8)	54 (16.8)	0.505
	No	259 (80.4)	35 (10.9)	224 (69.5)	
Maternal Complication After Child Birth	Yes	23 (7.1)	2 (0.6)	21 (6.5)	0.365
	No	299 (92.2)	42 (13)	257 (79.2)	
Infant Complication After Birth	Yes	52 (16.1)	4 (1.2)	48 (14.9)	0.122
	No	270 (83.9)	40 (12.4)	230 (71.5)	
Hospital Admission for Infants	Yes	86 (26.7)	11 (3.4)	75 (23.3)	0.472
	No	236 (73.3)	33 (10.2)	203 (63.1)	
Sex of Infant	Male	177 (55)	24 (7.5)	153 (47.5)	0.866
	Female	144 (44.7)	20 (6.2)	124 (38.5)	
Infants' Birth Weight	<2.5 kg	91 (28.3)	14 (4.3)	77 (24)	0.183
	2.5-3 kg	173 (53.6)	18 (5.6)	155 (48)	
	3-3.5 kg	44 (13.7)	10 (3.1)	34 (10.6)	
	>3.5 kg	14 (4.3)	2 (0.6)	12 (3.7)	
Infant Gestational Age	<37 weeks	66 (20.5)	5 (1.6)	61 (18.9)	0.073
	≥37 weeks	256 (79.5)	39 (12.1)	217 (67.4)	
Order of the Child	Mother for the first time	99 (30.5)	13 (4)	86 (26.5)	0.559
	Multiparous	223 (69.5)	30 (9.3)	193 (60.2)	
Timing of Mother's Plan for Breastfeeding	Before pregnancy	143 (44.4)	24 (7.5)	119 (36.9)	0.431
	During pregnancy	73 (22.7)	8 (2.5)	65 (20.2)	
	After delivery	71 (21.1)	8 (2.5)	63 (18.6)	
	Did not decide	35 (10.9)	4 (1.2)	31 (9.7)	
Mother's Plan for Breastfeeding	Exclusive breastfeeding	73 (22.7)	33 (10.2)	40 (12.5)	0.000*
	Mixed feeding	230 (71.4)	10 (3.1)	220 (68.3)	
	Formula-only feeding	19 (5.9)	1 (0.3)	18 (5.6)	
Place where the Infant Slept During First Six Months	In-Room	308 (95.7)	42 (13)	266 (82.7)	0.594
	Separate room	14 (4.4)	2 (0.6)	12 (3.8)	

Frequency of Breastfeeding per Day**	<5 times	120 (40.4)	8 (2.7)	112 (37.7)	0.004*
	5-8 times	124 (41.8)	22 (7.4)	102 (34.4)	
	>8 times (upon-demand)	53 (17.8)	13 (4.4)	40 (13.4)	
Frequency of Breastfeeding per Night **	Once	52 (17.5)	2 (0.7)	50 (16.8)	0.000*
	2-3	184 (62)	23 (7.7)	161 (54.3)	
	4-6	61 (20.5)	18 (6.1)	43 (14.4)	
Previous Experience of Breastfeeding with Last Child	Yes	18 (5.6)	6 (1.9)	12 (3.7)	0.000*
	No	304 (94.4)	38 (11.8)	266 (82.6)	
Pacifier Use	Yes	159 (49.4)	23 (7.1)	136 (42.3)	0.401
	No	163 (50.6)	21 (6.5)	142 (44.1)	
Use of Herbs that Increase Milk Production	Yes	95 (29.5)	12 (3.7)	83 (25.8)	0.795
	No	227 (70.5)	32 (9.9)	195 (60.6)	
Use of a Breast Pump	Yes	183 (56.8)	22 (6.8)	161 (50)	0.205
	No	139 (43.2)	22 (6.8)	117 (36.4)	
Enrolment of the Child in Nursery	Yes	40 (10.4)	4 (1.2)	36 (9.2)	0.519
	No	289 (89.8)	40 (12.4)	249 (77.4)	

* Statistically significant ($p<0.05$); ** Not including non-breastfeeding infants

Infant feeding patterns

While 94.4% of the mothers were successful in initiating breastfeeding on the first day of delivery, only 13.7% of all infants were exclusively breastfed at the age of 6 months (Figure 1). Of the 322 infants in this study, more than half of them had received mixed feeding since birth, and approximately 18.3% were exclusively bottle-fed for the first six months of their life. Eighty percent of the breastfeeding mothers breastfed their infants upon demand. Most of them practiced rooming in 95.6%.

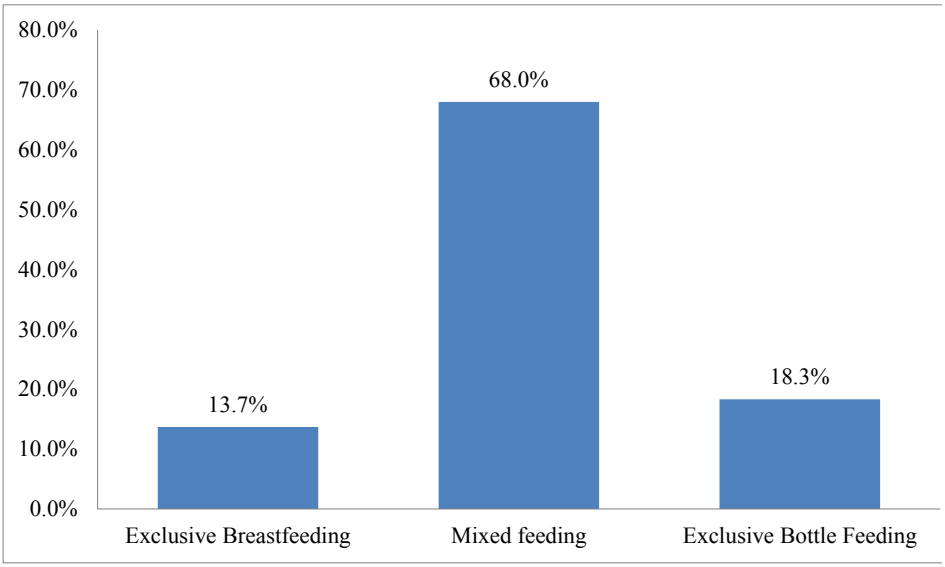

Figure 1 Breastfeeding patterns among Saudi mothers for the first six months of infants' life in Riyadh, Saudi Arabia (2015)

Factors influencing exclusive breastfeeding practice

The influencing factors were explored using multivariate logistic regression analysis (Table 2). Exclusive breastfeeding was more likely to be reported by mothers who planned to exclusively breastfeed, who had a successful breastfeeding experience, and who breastfed their infants upon demand and frequently at night.

Table 2 Model summary of multivariate logistic regression of significant factors predicting exclusive breastfeeding for the first six months of infant life, Riyadh (2015)

Exclusive Breastfeeding	B	Std. Error	Wald	df	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
							Lower Bound	Upper Bound
Pre-plan for exclusive breastfeeding	3.611	0.756	22.792	1	0	37.009	8.403	162.987
Frequency of breastfeeding during day	-0.072	0.909	0.006	1	0.54	0.931	0.157	5.534
Frequency of breastfeeding during night	-1.210	0.683	3.137	1	0.006	0.298	0.078	1.138
Previous experience with exclusive breastfeeding	-1.500	0.638	5.526	1	0.019	0.223	0.064	0.779

Mothers' breastfeeding plans and previous experiences

Approximately 44.4% of the mothers decided to breastfeed their infants before pregnancy, 22.7% during pregnancy, and 21.1% after birth, whereas 10.9% decided not to breastfeed. The majority of mothers planned to provide mixed breastfeeding (71.4%). Approximately a quarter of them planned to exclusively breastfeed (22.7), whereas only 5.9% planned to exclusively bottle feed (Table 1). Mother's plan to exclusively breastfeed was a significant factor in successfully providing exclusive breastfeeding for six months ($p<0.001$). Upon further evaluation of this predictor with multivariable logistic regression, we found that previous successful experience with exclusive breastfeeding was a significant predictor, as was breastfeeding infants more often upon demand during the day ($p<0.005$) and night ($p<0.005$) (Table 2).

Table 3 represents the sources of education about breastfeeding and the sources of encouragement, motivation, and support for mothers to breastfeed their infants. Encouragement from the mother-in-law was the only significant factor found after the correlation analysis of all of these sources ($p=0.012$).

Table 3 Sources of education and support for Saudi mother's decision to breastfeed exclusively for the first six months of infant's life in Riyadh, 2015

Variables		Total	Exclusive Breastfeeding (EBF)	Non-Exclusive Breastfeeding (NEBF)	p-value
Overall		322 (100)	44 (13.7)	278 (86.3)	-
Source of information about breastfeeding	At antenatal care	47 (29.9)	6 (3.8)	41 (26.1)	0.59
	At postpartum ward	97 (52.4)	14 (7.6)	83 (44.8)	0.913
	At well-baby clinic	24 (16.9)	3 (2.1)	21 (14.8)	0.578
	Attending special education session	4 (3)	0 (0)	4 (3)	0.595
	Media	57 (33.9)	6 (3.6)	51 (30.3)	0.59
	Relatives	74 (41.6)	6 (3.4)	68 (38.2)	0.248
	Friends	19 (13.6)	0 (0)	19 (13.6)	0.084
	Did not receive information	88 (44.6)	13 (7.1)	75 (37.5)	-
Sources of Support and Motivation to Continue Breastfeeding	Religiosity	88 (46.6)	14 (7.4)	74 (39.2)	0.154
	Medical team	54 (34.6)	8 (5.1)	46 (29.5)	0.379
	Husband	95 (51.4)	11 (5.9)	84 (45.5)	0.536
	Mother	144 (65.2)	16 (7.2)	128 (58)	0.53
	Mother-in-law	26 (18.2)	8 (5.6)	18 (12.6)	0.012*
	Relative	26 (18.2)	4 (2.8)	22 (15.4)	0.468
	Friend	14 (10.3)	3 (2.2)	11 (8.1)	0.672
	Did not receive encouragement	39 (26)	7 (4.7)	32 (21.3)	-

*Statistically significant ($p<0.05$). Multiple answers were allowed. Comparison performed with non-exclusive breastfeeding.

DISCUSSION

The percentage of breastfeeding initiation on the first day of delivery in our study was 94.4% [29]. Local published data in Saudi Arabia found that the rate of initiation of breastfeeding was 92% in Al-Hassa [23], 98.9% in Riyadh [30] and 94.0% in Jeddah [22]. Our figure is close to those reported rates.

Despite the high rate of breastfeeding initiation, the rate of exclusive breastfeeding for the first six months of infants' life was found to be only 13.7%, which is very low based on the World Health Organization (WHO) recommendation for infants to be exclusively breastfed for six months, followed by the introduction of complementary food [31]. However, this rate is higher than the reported percentage in Abha (a city in the south-western area of Saudi Arabia), which was 8.3% [32]. Data from Riyadh also reported a percentage of exclusive breastfeeding for the first six months of only 1.7% [24]. Only nineteen per cent of the mothers exclusively breastfed (EBF) their infants for six months in Taif in 2013, [15] whereas the reported rate in Jazan (a city in Saudi Arabia) was 26.9%, which is higher and similar to a rate reported by a study in Kuwait (26.5%) [32].

More than half of the mothers practiced mixed breastfeeding, with a rate of 68%. This finding is consistent with data from Riyadh, in which mixed breastfeeding, i.e. breast milk with formula, was the most common feeding practice, with a rate of 78.8% [24].

We found that 18.3% of mothers used formula-only feeding practices, which is higher than published data. In a study in the Emirates, the rate was only 1.7% [21].

El Mouzan and colleagues conducted an extensive review of the Saudi data and concluded that the pattern of infant feeding in Saudi Arabia has not changed much in the last two decades and remains very far from compliance with even the previous WHO recommendations [33].

Our study did not find a significant correlation between mother's age, education level, family income, employment status, maternal chronic disease, contraceptive use, order of the child, delivery type, gestational age, infant sex, weight of infant at birth, type of hospital, infant complication after delivery, infant hospital admission after delivery, mother's complications during pregnancy, mother's complications after birth, time of planning for breastfeeding, availability of formula feed in the hospital and place of residence. In contrast to our findings, the relationship between some of these factors and exclusive breastfeed was significant in other studies [21]. For example, in Al-Hassa, rural residence, older age, being a housewife and multiparity were positively correlated with exclusive breastfeeding for the first six months of infant's life [23]. In Lebanon, maternal employment (OR=3.92) was a significant predictor [34].

Regarding breastfeeding practices such as times of breastfeeding during the day and night, use of a method to increase lactation (herbs, medication, breast pump) and infant sleeping in the mother's room, feeding upon demand and during the night were significant predictors of successful breastfeeding for the first six months of infant life. Similarly, in Al-Hassa, feeding infants on demand was a significant predictor of success, (odds ratio of 3.4) [16]. Similar results were found in studies performed in Iran [20,35]. Koosha et al. reported that the chance of exclusive breastfeeding in Iran was higher in infants who were fed on demand (odds ratio (OR) 2.6) and breastfed more than eight times per day (OR=2.23) [36].

Previous success in exclusive breastfeeding and pre-plans for exclusive breastfeeding among mothers were the most significant predictors of success in exclusive breastfeeding. These findings are in agreement with a Lebanon study, which found that intention to breastfeed was an important predictor (OR=3.28; p=0.043) [34].

Approximately 45% of mothers reported that they did not receive information about breastfeeding. Education in the postpartum ward was the most common location reported by participants (44.6%), whereas only 29.9% received information during antenatal care and 16.9% at well-baby clinics.

Although we did not find a significant relationship between breastfeeding education and breastfeeding practices in the current study, the low reported rates of mother's education make it difficult to draw conclusions regarding this association and could explain the low rates of exclusive breastfeeding. In an Ethiopian study, mothers who received antenatal and postnatal care had better rates of exclusive breastfeeding (AOR 2.24; 95% CI 1.18, 5.76 and AOR 1.62; 95% CI 1.09, 3.21, respectively) [37].

In an experimental study in a rural area of Vietnam that examined the positive changes in fathers' knowledge, attitudes

and involvement in supporting exclusive breastfeeding (EBF) after the provision of breastfeeding education materials and counselling, fathers in the intervention group had higher breastfeeding knowledge and more positive attitudes towards early initiation of breastfeeding and 6-month exclusive breastfeeding and were also more likely to report active involvement in supporting mothers in practicing EBF during the antenatal and postpartum periods [38].

Regarding the sources of support for mothers' breastfeeding, most of the participants received support from their mothers (65.2%). The same was reported in Kuwait, where 60% of mothers thought that their mothers were a very important source of encouragement [32]. This factor was also a significant predictor in a study in Lebanon (OR=1.87, p=0.039) [34]. Husband support was also an important facilitating factor, with a prevalence of 51.4% in our study. About half of the mothers considered the Islamic religion as a source of encouragement. Similarly, 57% of Saudi school teachers responded that the most common reason for starting breastfeeding was their Islamic religious background [39]. The mothers in our study live in a religiously oriented community, where many verses of the Qur'an (Islamic Holy book) and Islamic prophetic traditions motivate mothers to breastfeed. In the Qur'an, Allah stated the following: "Mothers may breastfeed their children two complete years for whoever wishes to complete the nursing" [40]. Further correlational analyses showed that encouragement from a mother-in-law was the only significant source of motivation, although it was reported by only 18.2% of the participants.

The current practice of breastfeeding Saudi infants showed very low compliance with the WHO recommendations of exclusive breastfeeding for six months, but the high prevalence of breastfeeding initiation at birth indicates the willingness of Saudi mothers to breastfeed. The findings from this study might help implement a health promotion programme to encourage breastfeeding initiation and exclusive breastfeeding practice among Saudi mothers, given the benefits of breastfeeding for both mothers and their infants. These types of efforts should utilize antenatal care, the postpartum ward and well-baby clinics to educate mothers.

Limitation

We minimized the possibility of recall bias to the best of our ability by excluding mothers who had a child who was older than two years. These results may represent a "best-case scenario", and actual exclusive breastfeeding is likely to be lower. Data from our study can provide an overview of the current practices in this part of the world. The mothers were enrolled from one hospital. Women who attend other health facilities, including those in the private sector, may have a different socioeconomic status, which might imply different patterns and determinants of breastfeeding.

CONCLUSION/RECOMMENDATIONS

The results of this study indicate that only 13.7% of the mothers were successful in exclusively breastfeeding their infants.

We recommend conducting a national cohort study that enrols participants from different areas of the country, including rural areas, with different educational levels and socio-demographic characteristics to identify the determinants of breastfeeding practices and the barriers that force mothers to stop breastfeeding. Enrolling a large number of exclusively breastfed infants might show significant associations.

The majority of Saudi mothers have suboptimal breastfeeding practices. To gain the full benefits of breastfeeding for child health, there is an urgent need to develop interventions that improve the rates of exclusive breastfeeding to narrow the gap between current breastfeeding practices and the World Health Organization recommendations. Examples of interventions include calling for a national campaign that targets young populations to raise awareness about the advantages of continued breastfeeding, providing information about how to maintain best breastfeeding practices and overcome barriers and obstacles and recommending the establishment of appropriate places for breastfeeding in workplaces and public places. At the health care level, implementing a frequent assessment and evaluation of breastfeeding and supporting exclusive breastfeeding during the first six months of birth could be beneficial.

We believe that exploring these factors would help develop strategies to improve the duration of breastfeeding and hence fulfil the goals established by the WHO in our area.

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