

# Infant Feeding Pattern during the First Six Months of Age among Primipara Mothers

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## Abstract

The exclusive breastfeeding (EBF) rates are low globally and in Saudi Arabia. This study aimed to identify the type of infant feeding practiced during the first six months of age and determine if there is an association between demographic characteristics and the type of breastfeeding. A descriptive cross-sectional survey was conducted on 401 primipara mothers who attended 15 primary health care centers (PHCCs) by using a self-administered questionnaire. Only 17.2% of infants were exclusively breastfed, and 65.8% were given mixed feeding in the first six months of life. The breastfeeding rate declined from 99.8% in the first month to 76.3% by six months, with a corresponding increase in the use of formula milk, plain water and dates from 31.7%, 24.9%, and 24.7% in the first month to 53.1%, 49.1%, and 32.7% in the six months, respectively. Mothers also used herbs, lump sugar, glucose water and honey every month. A chi-square test reveals no association between the demographic characteristics and type of breastfeeding (EBF, predominant breastfeeding and mixed feeding). The primipara mothers had low EBF rates indicating the need to provide culture-specific education, support and counselling.

**Keywords:** Breastfeeding; Exclusive breastfeeding; infant feeding pattern; primipara.

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## INTRODUCTION

Numerous studies have highlighted the advantages of exclusive breastfeeding (EBF) in the first six months of the infants' lives. EBF is feeding only breast milk without any other liquids or solids, not even water, except for medicines (WHO, 2008). In fact, EBF is beneficial to both, the mothers and their infants. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months so that, infants and mothers receive maximum health benefits (WHO 2008). EBF promotes physical growth, neurological and cognitive development and protects infants against infectious and chronic diseases thereby reducing infant mortality related to common childhood illnesses such as diarrhea and pneumonia (WHO & UNICEF, 2019). Mothers benefit from breastfeeding by reducing the risks of breast cancer, ovarian cancer, and type II diabetes and improving birth spacing (WHO & UNICEF, 2019). Recent statistics show the global rate of EBF for six months of infants' life is only 44% (WHO & UNICEF, 2021). Despite EBF being beneficial to both, the mother and infants, the rate of EBF is lower than the global target of 70% by 2030.

The prevalence of EBF in several regions of Saudi Arabia is lower than the 44% recorded globally. However, the rates vary even within the regions. For instance, in the western region, reports show the rates varying from 14.4% to 27.6% (Azzeh, 2017; Hegazi *et al.*, 2019, and Alsulaimani, 2019). Whereas in a recent survey of a city in the southern region, the rate was 29.8% (Gohal *et al.*, 2023), while in the eastern region surveys in different cities reported rates between 12.2% and 36.9% (Amin, Hablas & Qader, 2011; Raheel & Tharkar, 2018 and Al-Anazi *et al.*, 2022). The surveys from the central region, particularly in the city of Riyadh, showed the EBF rates ranged from 19-28% (Al-Mutairi *et al.*, 2017; Alyousefi, 2021) which were also lower than the global rates. Interestingly, one city in the Northern region reported a prevalence of 50.7%, which is higher than the current global rates (Alshammari & Haridi, 2021), while another city in the same region reported a rate of 31.4% (Alzaheb, 2017). This indicates a wide variation in the EBF rates in the various cities and regions of Saudi Arabia.

While the EBF rates are found to be low, it is evident that mothers feed their babies with complementary feeds even before the age of 6 months.

Feeds other than EBF are classified as predominant breastfeeding and partial breastfeeding or mixed feeding (WHO, 2008; WHO, 2016). Mixed feeding is popular in some parts of Saudi Arabia, with one study reporting more than half (51.6%) of 252 mothers surveyed resort to this type of feeding (Al-Mutairi *et al.*, 2017). In mixed feeding, infants are fed breast milk and other artificial feeds and/or solid foods (WHO, 2016). Interestingly, a survey from the United Arab Emirates showed higher rates of mixed feeding (57.1%) and one in five mothers resorting to predominant feeding. While in predominant feeding, the infant receives breast milk as a predominant source of nourishment with liquids such as water and water-based drinks or fruit juice, in mixed feeding, infants are fed both breast milk and other artificial feeds and/or solid foods (WHO, 2008). Although feeding infants with formula milk is a common practice in Saudi Arabia (AlDughaiter & AlMutairi, 2020; Al-Mutairi *et al.*, 2017), mothers use other feeds such as water, herbs, baby tea, fresh fruit juice, sugar solution and dates paste (Al-Hreashy *et al.*, 2008; Albar, 2022). While some mothers introduce feeds other than breastmilk to their infants at birth itself, others introduce them gradually over six months or even later. For instance, some mothers introduce sugar or dates before any other feeds or during the first few days, which may be related to cultural or religious practice. For instance, within the Muslim religion, some believe that the first baby feed should be something sweet, whereas others rub the soft dates on the infant's palate (McKenna & Shankar, 2009; Hassan, 2022).

While most mothers do not exclusively breastfeed their infants, it will be interesting to know what type of feed they give to their infants during the first six months. The information on the month-wise introduction of feeds will provide a deeper understanding of the infant feeding pattern adopted by the mothers. These findings will form a basis for healthcare personnel to plan interventions for educating women regarding exclusive breastfeeding. Very few studies have explored this aspect of breastfeeding in the Saudi context. Hence, this study was undertaken to identify the type of feed given to infants from the first to sixth months of age and determine if there is an association between selected demographic characteristics and the type of infant feed. This article is part of a larger study.

## METHODS

### *Study Design, Setting and Sample:*

A cross-sectional survey was conducted on 401 women who attended 15 primary health care centres (PHCCs) in Riyadh, Saudi Arabia. Data were collected from August to December 2018. Sampling was done in two stages. In the first stage, 15 PHCCs were selected randomly, followed by the second stage, in which women attending the well-baby and vaccination clinics of the PHCCs were selected. The sample size was calculated by using the Raosoft website (<http://www.raosoft.com/samplesize.html>), with an

indicator percentage of .50, a margin of error of 5 %, and a confidence interval of 95%. The calculated sample was 377; after adding 20% to compensate for dropout, 453 primiparous women were initially selected. The primiparous mothers were eligible if they were between 18 and 35 years of age, literate, with a child 6-24 months of age, and if they had breastfed within the sixth month of the infant's life. Mothers who had multiple births, a preterm birth, or a child with congenital abnormalities were excluded.

### *Data collection:*

Data were collected using a pre-validated, author-developed 11-item breastfeeding practice questionnaire (BPQ) that elicited responses on their breastfeeding practices; the demographics were assessed through items on a demographic questionnaire from 453 women (only 401 surveys were complete). The responses elicited on the items related to the type of feeds given by women for the first six months after birth were analyzed and presented in this article, which is part of a larger study. The items were organized in a tabular form representing the type of feed given each month (formula milk, plain water, dates, herbs, lump sugar, glucose water, honey and an option to specify any other feed and to specify the types of herbs used). The instrument was content validated by six experts with a CVI index of 0.95 and 0.99 for clarity and relevancy; language validity was ascertained by translation and back-translation by independent language experts. The test-retest reliability with a one-week interval showed excellent stability (intraclass  $r = 0.977$ , based on absolute agreement, 2-way mixed-effects model).

### *Ethical considerations:*

The study was approved by the Institutional Review Board of King Fahad Medical City (IRB00010471) and from King Saud University (18/0287/IRB), Riyadh, Saudi Arabia. Participation in the study was voluntary and all mothers signed the written informed consent.

### *Data analysis:*

The types of breastfeeding were classified as: exclusive breastfeeding, predominant breastfeeding, partial breastfeeding/mixed feeding as per the WHO definition (WHO, 2008, 2016). Frequency and percentage were computed to describe the overall type of feed and the month-wise analysis of the individual feeds. The Chi-square was computed to find the association between selected demographic variables and the type of feed.

## RESULT

The response rate was 88.52%. The majority of women were between 18-26 years of age (56.4%), had bachelor's degrees (70.6%), were unemployed (74.1%), had family income between 6,000 - 15,000 SR (60.3%), had infants aged between 6-12 months (74.1%). Over

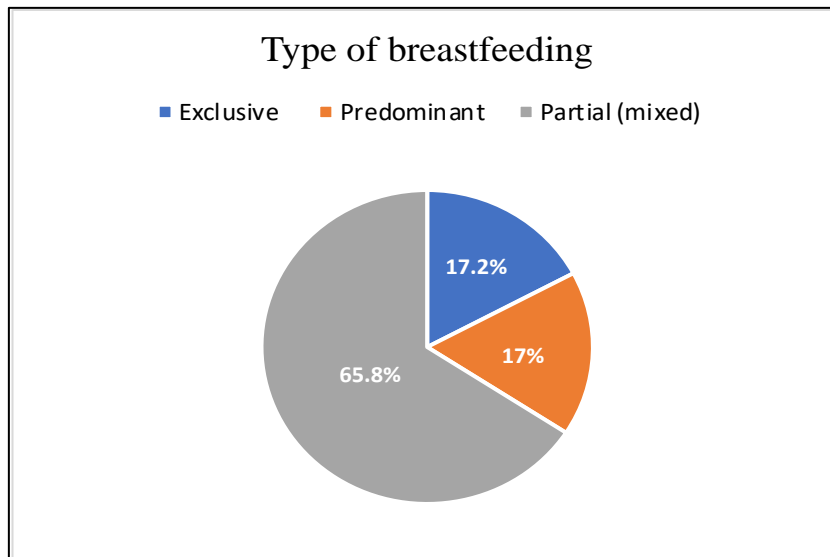
half of them (51.4%) made a pre-pregnancy breastfeeding decision (Table 1).

**Table 1: The Demographic Characteristics of Participants (N = 401)**

Demographic Characteristics	Frequency (n)	Percentage (%)
Mother's age (in years)		
18-26	226	56.4
27-35	175	43.6
Infant's age (in months)		
6 to 12	297	74.1
13 to 24	104	25.9
Educational level		
School level	69	17.2
Graduate degree	283	70.6
Postgraduate degree	49	12.2
Employment status		
Employed	104	25.9
Unemployed	297	74.1
Family income (per month)		
Less than 6,000 SR	39	9.7
6,000 - 15,000 SR	242	60.3
More than 15,000 SR	82	20.4
Breastfeeding decision		
Pre-pregnancy	206	51.4
Antenatal	136	33.9
Postnatal	59	14.7

**Type of breastfeeding:**

More two third of the women surveyed used mixed feed (65.8%), while the rest of them either gave EBF (17.2%), or predominant feed (17%) (Figure 1).



**Figure 1: The percentages of breastfeeding type for the first 6 months of infant's life as per WHO definitions**

**The pattern of feeds from first to sixth month:**

Analysis showed a decline in breastfeeding from 99.8% to 67.3% and an increase in the use of formula feed from 31.7% to 53.1% (Figure 2). With almost all women (99.8%) breastfeeding in the first month, the rate reduced in the consecutive months until the sixth month (92%, 85.5%, 81%, 78.8% and 76.3%). As the infant grew older, although the women continued

breastfeeding, they introduced formula milk, which gradually increased from almost a third of them (31.7%) using this feed in the first month, to 40.1% in the second, 46.9% in the third and more than half, that is 50.4%, 52.1% and 53.1% in the fourth, fifth and sixth months respectively. These findings indicate that formula milk feed was popular among infants. Besides formula milk, most women fed their infants with plain water, dates,

herbs, lump sugar, glucose water, honey, and other edible substances. However, with the introduction of these feeds, breastfeeding also gradually decreased. Plain water was introduced to the infants in the first month, with almost one in four infants in the first month (24.9%) to around one in two infants in the sixth month (49.1%) being fed plain water. Also, mothers fed herbs to their infants, which was the next most common feed. In the first two months, more than a third of the infants were fed herbs (1<sup>st</sup> month: 34.9%, 2<sup>nd</sup> month: 34.4%) while over a fourth continued feeding herbs from the third to the sixth month. Commonly used herbs were mint, anise, fenugreek and baby tea. Another commonly used feed was dates, with around a fourth of the mothers (24.7%)

feeding their infants with dates in the first month, which gradually increased to a third (32.7%) by the 6<sup>th</sup> month. Lump sugar was fed to almost one-fourth of the infants (22.9%) in the first month, and reduced to a fifth (20.2%) in the 2<sup>nd</sup> month, which further declined as the months progressed. Very few of the mothers fed glucose water (1.7% to 8.2%) and honey (2.2% to 6.5%) to their infants through the first six months of age. A very small percentage of infants were fed with other feeds. The analysis of 'other feeds' included mashed vegetables and fruit (46%), 'Cerelac' a baby cereal food (22.4%), yogurt (12.2%) orange juice (8.1%), whole grains (4%), and corn flour cooked with dates (2%). A further 2% used medication for colic.

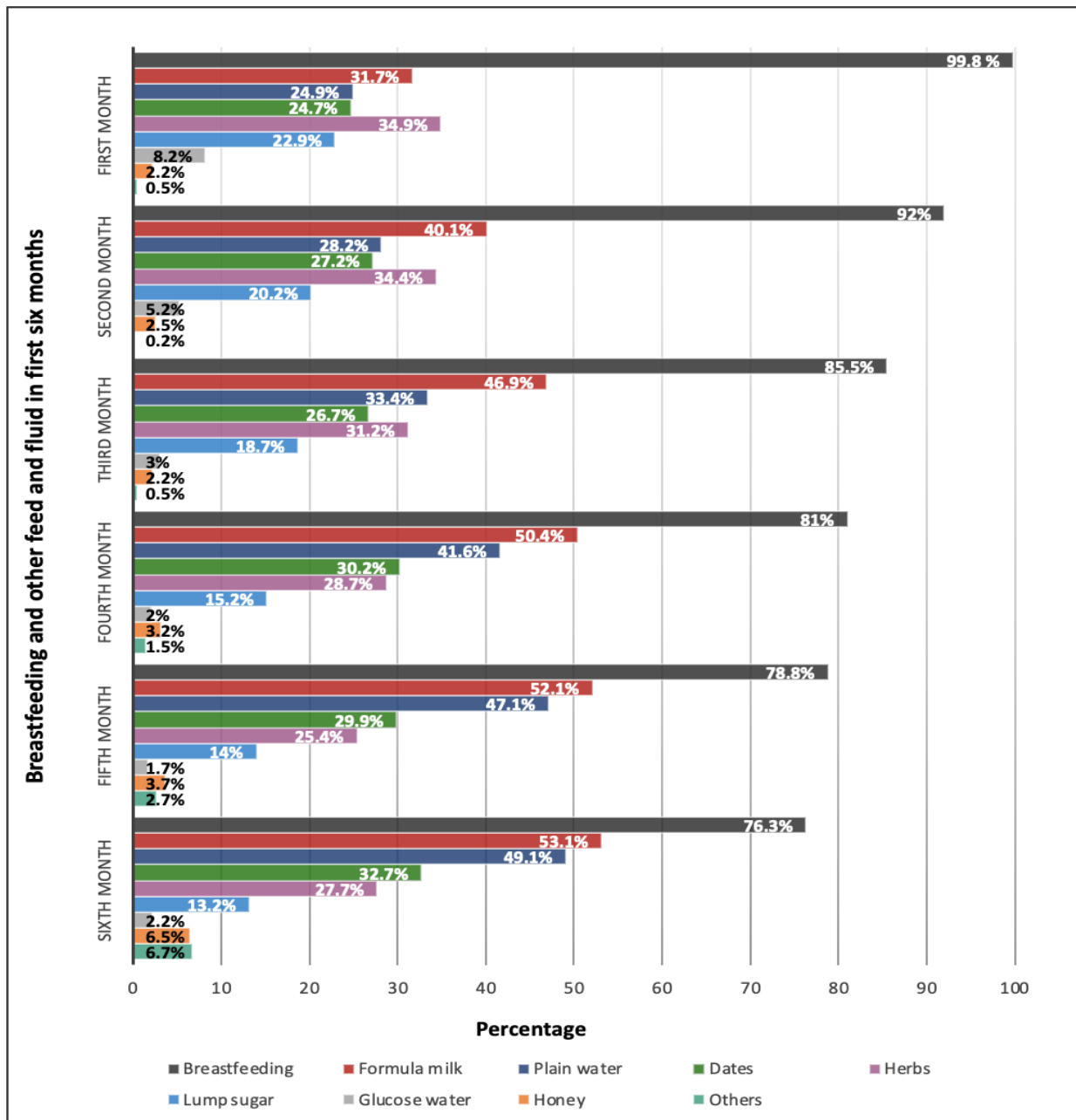


Figure 2: The month-wise percentages of breastfeeding and other feeds and fluids given to infants in the first six months after birth.

### Association between demographical characteristics and type of breastfeeding:

A chi-square test of association showed that the demographic variables including the mother's age, infant's age, mother's education level, employment

status, family income, and breastfeeding decision were not significantly associated with any of the types of feed: exclusive breastfeeding, predominant feeding and mixed feeding, indicating that these variables were independent of all types of breastfeeding (Table 2).

**Table 2: The Associations between the Type of Breastfeeding and Demographic Characteristics, using the Chi-Square Test (N = 401)**

Demographic Characteristics	Exclusive breastfeeding (EBF)					Predominant breastfeeding					Mixed feeding				
	Yes	No	$\chi^2$	df	P	Yes	No	$\chi^2$	df	P	Yes	No	$\chi^2$	df	P
Mother's age (in years)															
18-26	35	191	1.076	1	.300	45	181	3.209	1	.073	148	78	.028	1	.867
27-35	34	141				23	152				116	59			
Infant's age (in months)															
6 to 12	45	252	3.396	1	.065	55	242	1.981	1	.159	195	102	.016	1	.898
13 to 24	24	80				13	91				69	35			
Educational level															
School level	14	55	.687	2	.709	13	56	.422	2	.810	42	27	1.245	2	.537
Graduate degree	46	237				48	235				191	92			
Postgraduate degree	9	40				7	42				31	18			
Employment status															
Employed	17	87	.073	1	.787	18	86	.012	1	.912	69	35	.016	1	.898
Unemployed	52	245				50	247				195	102			
Family income per month															
Less than 6,000 SR	7	32	4.438	2	.109	7	32	.753	2	.686	26	13	2.138	2	.343
6,000 - 15,000 SR	37	205				42	200				163	79			
More than 15,000 SR	21	61				11	71				48	34			
Breastfeeding decision															
Pre-pregnancy	35	171	4.783	2	.092	40	166	1.859	2	.395	131	75	3.395	2	.183
Antenatal	29	107				20	116				88	48			
Postnatal	5	54				8	51				45	14			

## DISCUSSION

This research sought to determine the type of infant feed given from the first to six months of age. The findings revealed that mixed feeding was the most common practice compared to EBF or predominant breastfeeding. Most mothers started breastfeeding in the first month of the infant's life, which gradually declined by the sixth month, with a corresponding increase in the use of formula milk. Plain water, dates, herbs, lump sugar, glucose water, and honey were also given to infants.

The EBF rates were low among the participants, which were below the global targets. This finding is supported by previous reports from Saudi Arabia (Al-Mutairi *et al.*, 2017; Alyousefi, 2021) and other Arab countries (Al Ketbi *et al.*, 2018; Naja *et al.*, 2022). Most women gave mixed feeds to their infants. Mixed feeding is more prevalent in the central region of Saudi Arabia, where our study was conducted (76%), compared to another city, Dammam (48%), located in the eastern region (Raheel & Tharkar, 2018). Our study affirms those findings, with almost two-thirds (65.8%) giving mixed feeds to their infants in the first six months of life. Cultural and traditional practices vary in regions, which may also explain the high prevalence of mixed feeds in our study.

However, the low rate of EBF in our sample may be related to low awareness about EBF. Raheel & Tharkar (2018), reported women who were educated about EBF during the antenatal period are more likely to practice EBF. Alzaheb (2017), found that awareness of the recommendation of EBF was positively associated with exclusive breastfeeding. However, future studies need to link the month-wise practices with the knowledge of women regarding EBF and identify the social and cultural factors associated with low exclusive breastfeeding rates.

Our participants are first-time mothers with no previous experience in breastfeeding and a lack of self-efficacy, which could be attributed to the low rate of EBF. Previous studies showed that primiparous mothers had a shorter duration of breastfeeding, and increased introduction of formula milk (Al-Hreashy *et al.*, 2008), and the multiparous mothers were more likely to exclusively breastfeed their infants for six months (Amin *et al.*, 2011). Breastfeeding education and counselling especially for first-time mothers is needed to improve the continuity of breastfeeding and EBF.

Our findings of a decline in the breastfeeding rates from the first to the sixth month (from 99.8% to



67.3%) align with those reported previously (from 99.8% at birth to 50% at six months of age) in a survey of Saudi women (Al-Hreashy *et al.*, 2008). In Al-Hreashy's study, only 50% of the mothers breastfed their infants by six months of age, which is lower than our findings, which could be attributed to the fact that a large percentage of our participants were not employed and could continue breastfeeding for a longer duration. Previous studies have reported a longer duration of breastfeeding in those not employed, compared to those employed (Ryan, Zhou, & Arensberg, 2006). However, the gradual decline over six months could be attributed to the several challenging roles adopted by mothers, while breastfeeding, leading to either decrease or stopping breastfeeding (Murad *et al.*, 2021). One qualitative study reported disturbance in body image or fear of gaining weight as a reason for discontinuing breastfeeding (Abouelfetoh, & Matrafi, 2021).

Most of our participants resorted to using formula milk. While almost a third gave formula milk in the first month, that rate increased to over a half, in the sixth month, making it the most common type of feed other than breastfeeding. The increase in the use of formula milk with a decrease in breastfeeding was reported previously in Saudi Arabia (Al-Hreashy *et al.*, 2008) and recently in the USA (Karmaus *et al.*, 2018). The inverse rate between breastfeeding and the use of formula milk could be attributed to the lack of support, pediatrician advice, negative comments (Murad *et al.*, 2021) and ease of use. A qualitative study of Saudi mothers reported that formula feeds were used because it was easier and less time-consuming to feed (Abouelfetoh, & Matrafi, 2021).

Feeding the infant plain water could affect their growth and development because it lacks nutritive values. Almost a fourth of our participants introduced plain water in the first month and gradually the consumption of water increased every month to around half of them using it by the sixth month. Plain water is commonly used, as revealed in a previous study from Saudi Arabia, where 84% of the infants were fed plain water (Albar, 2022). Another study in South Africa found that most mothers gave their infants water while breastfeeding (91%) or along with formula feeds (88%) (Goosen, McLachlan, & Schübl, 2014). The belief that breastmilk does not provide sufficient fluid may have prompted our participants to give plain water to their infants.

Our study also found that mothers fed their infants herbs consistently from the first to the sixth month. The common herbs used were mint, anise, fenugreek and baby tea. Herbs are often used to treat colic. Infants who are fed with formula milk are often fed herbs to relieve colic and the use of herbs in our participants may be attributed to the colic as most participants fed formula milk to their infants. In a recent study infants fed with formula milk had experienced

colic, and herbs were used to treat colic; anise was the most common herb used, followed by chamomile, fennel, and cumin (Mustafa *et al.*, 2023).

Consistent with our findings Albar (2022) reported that dates were fed to the infants. Feeding dates to infants is traditionally followed in the Saudi culture as it entails religious beliefs. In the Islamic religion, Tahneek is referenced in Sunnah, which is the use of soft dates to feed the infant (Hassan, 2022), which could be attributed to the practice followed by our participants who follow the Islamic religion.

Our study showed that the demographic factors (mother's age, infant's age, education level, employment status, family income, and breastfeeding decision) were not associated with the type of breastfeeding (exclusive, predominant or mixed). Similarly, a recent study in Saudi Arabia reported no association between EBF and the mother's age, education, family income, and employment (Alissa, & Alshareef, 2024). On the contrary, another study found working status associated with the type of feeding; women who were employed had significantly used mixed feeding (Al Sabbah, 2022). Another study found mother's education was a significant factor associated with EBF (Hegazi *et al.*, 2019). Future in-depth research on this aspect is warranted.

### Limitations

Our sample consisted of only primiparous women, which limits the generalizability of the findings. Also, mothers were asked to recall the feeds for each month which may have led to recall bias that may have affected the data quality. Longitudinal studies can be designed on cohorts who are followed up at periodic intervals to assess the breastfeeding practice to avoid recall bias. Further, cultural differences in provinces of Saudi Arabia other than the Riyadh province may also limit generalizability. Future studies on more diverse populations from different geographic regions can enhance the sample's representativeness.

### CONCLUSION

In conclusion, this study identified the type of infant feeding and the month-wise feeding practices. Saudi primiparous mothers mostly practiced mixed feeding for the first six months of their infant's life. The global recommendation of EBF in the first six months is not practiced by most mothers; the practice of EBF is far below the global recommendations. Breastfeeding declined from the first to the sixth month of the infant's life with an increase in the formula feed and the practice of feeding infants with plain water was common. Mothers fed dates and herbs to their infants. Healthcare professionals should encourage mothers to breastfeed exclusively and provide education, support and counselling. The information from this study can help policymakers develop culturally appropriate interventions for enhancing the EBF rate in Saudi Arabia.

Furthermore, qualitative research that explores the reasons and beliefs associated with other feeding practices will provide in-depth information for improving breastfeeding status.

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