

# Determinants of exclusive breastfeeding among Chinese mothers in the first 6 months

## Abstract

**Background/Aims** Exclusive breastfeeding duration remains suboptimal among Chinese mothers. Understanding the factors that influence exclusive breastfeeding is essential for developing targeted interventions to promote breastfeeding practices. This study aimed to identify determinants of exclusive breastfeeding in the first 6 months after birth in Xuzhou City, China.

**Methods** This prospective study enrolled 178 mothers, using structured questionnaires for data collection. Subsequent analysis used multiple linear regression to explore factors associated with exclusive breastfeeding duration.

**Results** On average, participants exclusively breastfed for 67 days. Influencing factors included breastfeeding intention, perception of insufficient milk and maternity leave.

**Conclusions** Targeted interventions have the potential to prolong exclusive breastfeeding duration, such as ensuring women develop accurate perceptions of their breast milk supply and extending maternity leave. Implementing these interventions is crucial to achieving the target of 6 months of exclusive breastfeeding, consequently contributing to optimal health benefits for mother–infant dyads in China.

## Keywords

China | Determinants | Exclusive breastfeeding

Breastfeeding provides unparalleled health benefits for mothers and their infants (Prentice, 2022), and there is a dose–response relationship (Buyken et al, 2008; Su et al, 2021). Health outcomes can be enhanced by breastfeeding more often and for longer. The World Health Organization (WHO, 2019) recommends exclusive breastfeeding for the first 6 months postpartum, without introducing other liquids except for medically prescribed supplements.

Exclusive breastfeeding provides all the necessary nutrients for infants in the first 6 months of life. Exclusive breastfeeding for 6 months can reduce infant mortality by reducing the prevalence of conditions such as diarrhea and respiratory and gastrointestinal infections (Dina and Djuwita, 2021; North et al, 2022). It has also been estimated to save the lives of at least 800 000 babies every year (Ogunba, 2019), and maternal risk of breast cancer when exclusively breastfeeding is only 2% (Scoccianti et al, 2015), ovarian cancer by 27–35% (Jordan et al, 2012) and type 2 diabetes by at least 50% (Schwarz et al, 2010).

However, no country fully meets the WHO guidelines for exclusive breastfeeding (Lancet, 2017). Worldwide, only 40% of infants under 6 months old are exclusively breastfed (Buckland et al, 2020). In the USA, the exclusive breastfeeding rate for the first 6 months is 24.9% (Buckland et al, 2020), and in Japan, it is 37.4% (Inano et al, 2021). China has a low 6-month exclusive breastfeeding rate; in Jiangsu province, the anticipated rate of exclusive breastfeeding among infants aged 7–28 days is only 25.6%, falling significantly short of the 50% target set for 6-month-old infants in the health-related sustainable development goals and healthy Jiangsu 2030 goals (Chen et al, 2018). A study in China found that 74.7% of mothers sustained exclusive breastfeeding for 1 month, decreasing to 64.7% at 3 months and 13.8% at 6 months (Wu et al, 2019).

Establishing the factors that influence exclusive breastfeeding is crucial for guiding nursing practices. A systematic review of global literature found that reported predictors for 6-month exclusive breastfeeding included breastfeeding knowledge, maternity leave, breastfeeding

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attitude, subjective norm (perceived approval/disapproval from significant others towards breastfeeding), perceived control, perception of insufficient milk and breastfeeding intention, supported by moderate to strong evidence (Wu et al, 2022).

Few studies have explored 6-month exclusive breastfeeding rates and influencing factors in China. Most assessed exclusive breastfeeding practice well before 6 months (Du et al, 2018; Zhu et al, 2019; Zhou et al, 2024). Additionally, 24-hour or 7-day recall methods were commonly used to assess exclusive breastfeeding, which could result in an overestimation of duration; these methods may allow the introduction of foods in the early months to be overlooked (Binns et al, 2009; Nanishi et al, 2023). Compared with sociodemographic factors, psychological factors related to breastfeeding (breastfeeding intention, perceived insufficient milk) have not been explored to the same degree in China. Additionally, the majority of studies have primarily focused on the impact of maternal factors on exclusive breastfeeding, without considering the influence of others, such as in-laws and spouses. In terms of maternity leave, numerous provinces in China have extended the duration by an additional 1–2 months beyond the national statutory period (98 days) (Li et al, 2021). This is still less leave than allowed for in many other countries, including the UK, which grants women 365 days of maternity leave and Sweden, which grants 480 days. However, as both these countries also report low levels of exclusive breastfeeding at 6 months, the impact of limited maternity leave on exclusive breastfeeding in China may not be equivalent to other countries.

The predictors of exclusive breastfeeding at 6 months need to be explored in the context of Chinese culture, and a prospective study can help mitigate overestimation of duration. This study used the ‘Theory of Planned Behavior’ theoretical framework, which posits that behaviour can be influenced by belief variables (attitude, subjective norm and perceived control) through behavioral intention (Ajzen, 1991). Using this model in conjunction with the findings of previous studies, the present study aimed to assess exclusive breastfeeding duration in the first 6 months postpartum and explore its predictors among Chinese mothers.

## Methods

A prospective study design was used to explore exclusive breastfeeding duration in the first 6 months postpartum in China. The study was carried out at a tertiary hospital in Xuzhou, Jiangsu Province from September 2022 to March 2023. In China, tertiary hospitals are large healthcare facilities directly managed by national, provincial or municipal authorities.

## Sampling

The target population was adult mothers in the postnatal wards of tertiary hospitals in Xuzhou City, Jiangsu Province. Multi-stage random sampling was used. First, a tertiary hospital was selected by lottery, and participants were then randomly recruited by lottery from eligible women in the postnatal wards. Women were considered eligible if they were at least 18 years old, had a single healthy full-term newborn, spoke fluent Mandarin, had initiated breastfeeding and currently had no health conditions affecting breastfeeding practice. Women were excluded if they or their infants had serious health problems meaning that breastfeeding was not recommended by the pediatrician.

The sample size was determined by G\*Power software, with an effect size of 0.15, an  $\alpha$  error probability of 0.05, a power of 0.95, and 8 predictors. The sample size was calculated at a minimum of 89 women. A total of 180 participants from Pizhou People’s Hospital were recruited to participate.

## Data collection

Data concerning predictive variables (breastfeeding knowledge, maternity leave, breastfeeding attitude, subjective norm, perceived control, perceived insufficient milk, and breastfeeding intention) were gathered by the authors using five self-reported questionnaires administered in face-to-face interviews before discharge from the postnatal ward. Interviews lasted 20–30 minutes.

Breastfeeding knowledge was measured using the breastfeeding knowledge questionnaire (Chinese version) (Zhao, 2008). The questionnaire consisted of 17 items, with correct responses awarded 1 point and incorrect or uncertain answers assigned 0 points. A higher score indicated participants had more breastfeeding knowledge. This questionnaire shows good reliability with a Cronbach’s alpha of 0.86 (Duan et al, 2018).

A sociodemographic questionnaire designed by the research team was used to gather data on basic maternal information, including maternity leave. Unemployed women were considered to have 180 days of maternity leave, as they were assumed to have similar freedom and time to accompany and breastfeed their babies.

Breastfeeding attitude (29 items), subjective norm (5 items) and perceived control (10 items) were estimated by the relevant subscales of the Breastfeeding Attrition Prediction Tool (Chinese version) (Zhu et al, 2017). This tool used a 5-point Likert scale and has a Cronbach’s alpha of 0.88. Higher scores indicated a more positive attitude, stronger subjective norm and higher perceived control.

Perception of insufficient milk was measured by the Perception of Insufficient Milk Questionnaire, which was translated into Mandarin by the research team (Wu and

**Table 1. Participants' characteristics**

Category		Frequency, n=178 (%)
Age (years) Range=28 Mean=30.27 Standard deviation=4.60	≤20	2 (1.1)
	21–30	96 (53.9)
	31–40	75 (42.1)
	≥41	5 (2.8)
Gestation (weeks) Range=4 Mean=39.16 Standard deviation=1.10	37–38	27 (15.2)
	38+1–39	59 (33.1)
	39+1–40	66 (37.1)
	>40	26 (14.6)
Residence	Urban	136 (76.4)
	Rural	42 (23.6)
Average monthly family income (Chinese Yuan)	<3000	3 (1.7)
	3000–6000	14 (7.9)
	6000–10 000	58 (32.6)
	>10 000	103 (57.9)
Education	College degree or below	133 (74.7)
	Bachelor degree or above	45 (25.3)
Employment	Employed	116 (65.2)
	Unemployed	62 (34.8)
Parity Range=2 Mean=1.47 Standard deviation=0.54	1	99 (55.6)
	2	75 (42.1)
	≥3	4 (2.3)
Breastfeeding experience	Yes	68 (38.2)
	No	110 (61.8)
Received breastfeeding education	Yes	106 (59.6)
	No	72 (40.5)
Maternity leave (days) Range=150 Mean=151.48 Standard deviation=43.24	<90	16 (9.0)
	90–120	20 (11.2)
	121–160	36 (20.2)
	>160	106 (59.6)

Wacharasin, 2022). It contains one global question on perceived sufficiency of breast milk (answered yes or no) and five items scored 1–5. A higher score indicated that mothers perceived that they had more breast milk supply. The Cronbach's alpha for this tool is 0.94.

Breastfeeding intention was evaluated by the Infant Feeding Intention Scale, which used a 5-point Likert scale with five items. A higher score suggested stronger maternal intention to maintain exclusive breastfeeding

for longer. Its content and construct validity are 0.92 and 0.997 respectively (Wu et al, 2018).

Exclusive breastfeeding was monitored through a daily record form designed for mothers to document their exclusive breastfeeding practice. Cumulative days of exclusive breastfeeding were estimated through three telephone interviews conducted at 2, 4 and 6 months' postpartum. A study completion incentive was provided and consisted of an 'Encyclopedia of Infant and Early Childhood Development'.

The forward-backward process (Sousa and Rojjanasrirat, 2011) was used to translate the perceived insufficient milk questionnaire. First, two translators independently translated the questionnaire. A nursing professor compared the two translations, and generated a preliminary initial translated version. Then two translators independently back-translated this version, which was reviewed by a multidisciplinary committee in comparison to the original version. The translated questionnaire was pilot tested and modified based on any identified problems. The final translated version was created based on psychometric testing.

**Data analysis**

Statistical analysis was conducted using the Statistical Package for the Social Sciences (version 23.0). Descriptive analysis was used to present quantitative variables as means ± standard deviation, while categorical variables were articulated as frequencies and percentages. The Pearson product-moment correlation coefficient was used to evaluate the linear relationship between 6-month exclusive breastfeeding and each predictive variable. Building on Pearson's correlation analysis, multiple linear regression analysis was used to examine factors influencing 6-month exclusive breastfeeding. A 2-tailed *P*<0.05 was considered indicative of statistical significance.

**Ethical considerations**

This study received approval from the ethics committee of Burapha University (reference: G-HS001/2565) and Pizhou People's Hospital (reference: 20220906-01). The researchers explained the study's purpose, data collection procedure and the voluntary nature of participation to the participants. Participants signed consent forms before questionnaires were administered.

**Results**

Of the 180 mothers invited to participate, 178 responded. The participants' characteristics are shown in *Table 1*. Among the participants, 76.4% lived in urban areas, 74.7% were educated to college level or lower and 40.5% never received breastfeeding education. Average maternity leave was 151.48±43.24 days.

As shown in Table 2, the mean score for breastfeeding knowledge was  $11.17 \pm 3.04$ , indicating moderate knowledge. The mean scores for breastfeeding attitude, subjective norm, and perceived control were  $100.87 \pm 13.20$ ,  $21.44 \pm 3.60$ , and  $35.89 \pm 8.32$  respectively, suggesting upper-moderate levels. The average score for perceived insufficient milk was  $16.92 \pm 4.41$ , and  $10.40 \pm 3.61$  for breastfeeding intention, indicating moderate levels. On average, participants only exclusively breastfed for  $67.30 \pm 71.68$  days. Further details of exclusive breastfeeding duration are shown in Figure 1. Almost half of the participants (48.3%) maintained exclusive breastfeeding for 2 months, dropping to 46.1% at 3 months and 39.3% at 4 months. At 5 months, the rate dropped much lower, to 26.4%, and at 6 months, only 13.5% of participants were still exclusively breastfeeding.

Factors found to have significant correlations with 6-month exclusive breastfeeding were breastfeeding knowledge ( $r=0.15$ ,  $P=0.041$ ), breastfeeding attitude ( $r=0.22$ ,  $P=0.003$ ), subjective norm ( $r=0.30$ ,  $P<0.001$ ), perceived control ( $r=0.38$ ,  $P<0.001$ ), perceived insufficient milk ( $r=0.38$ ,  $P<0.01$ ), breastfeeding intention ( $r=0.47$ ,  $P<0.001$ ) and maternity leave ( $r=0.24$ ,  $P=0.001$ ). The results of Pearson correlation analysis are shown in Table 3.

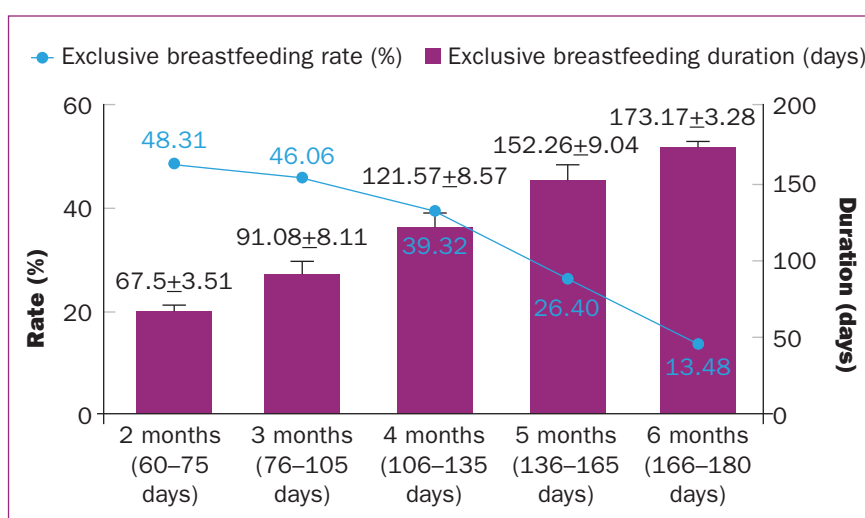
As shown in Table 4, multiple linear regression found that breastfeeding intention ( $P=0.010$ ), perceived insufficient milk ( $P=0.010$ ) and maternity leave ( $P=0.030$ ) were factors influencing exclusive breastfeeding for the first 6 months, with 27.00% of the variance explained by these factors (adjusted  $R^2=0.270$ , standard error of the estimate=61.425,  $F=10.342$ ,  $P<0.001$ ).

## Discussion

Given the low rates of exclusive breastfeeding reported in China, this study was conducted to explore exclusive breastfeeding duration in the first 6 months postpartum and the factors influencing the duration of exclusive breastfeeding among Chinese mothers. The average exclusive breastfeeding duration for participants was short (67 days). More than half of the participants ceased exclusive breastfeeding before 2 months postpartum and the exclusive breastfeeding rate notably decreased after 4 months, with only 13.5% of participants exclusively breastfeeding their infants at 6 months. Other provinces in China report similarly low rates, with an average duration of approximately 4 months in Shandong Province and 2.9–3.3 months in Zhejiang and Shanghai (Li et al, 2020). To improve exclusive breastfeeding, it is crucial to identify factors, especially modifiable predictors, influencing exclusive breastfeeding in the context of Chinese culture.

**Table 2. Breastfeeding variables**

Variable	Possible range	Actual range	Mean (standard deviation)
Breastfeeding knowledge	0–17	4–17	11.17 (3.04)
Breastfeeding attitude	29–174	59–143	100.87 (13.20)
Subjective norm	12–72	15–25	21.44 (3.60)
Perceived control	10–60	11–50	35.89 (8.32)
Perceived insufficient milk	5–25	7–25	16.92 (4.41)
Breastfeeding intention	0–16	0–16	10.40 (3.61)
Exclusive breastfeeding duration	0–180	0–179	67.30 (71.68)



**Figure 1. Rate and mean duration of exclusive breastfeeding**

Breastfeeding intention was an important determinant of exclusive breastfeeding. Aligning with the theory of planned behaviour, intention is a motivating factor for a given behaviour (Ajzen, 2020). Those with a strong behavioural intention are more likely to take this behaviour into practice. Mothers with higher scores for breastfeeding intention were more inclined to practice exclusive breastfeeding in the first 6 months postpartum. Previous studies have also identified intention as a positive predictor of exclusive breastfeeding for the first 6 months (Bajoulvand et al, 2019; De Roza et al, 2019; Sangin et al, 2020). However, in the present study, the participants' breastfeeding intention scores were only graded as 'moderate'. Further studies should explore the predictive impact of breastfeeding intention on exclusive breastfeeding for the first 6 months postpartum and develop interventions aimed at enhancing breastfeeding intention in China.

The findings of this study align with previous research indicating that perceived insufficient milk is a significant factor influencing exclusive breastfeeding

**Table 3. Correlation coefficients**

Variables	Breastfeeding knowledge	Breastfeeding attitude	Subjective norm	Perceived control	Perceived insufficient milk	Breastfeeding intention	Maternity leave	Exclusive breastfeeding
Breastfeeding knowledge	1	0.31**	0.22**	0.37**	0.32**	0.27**	0.07	0.15*
Breastfeeding attitude		1	0.08	0.48**	0.24**	0.32**	0.17*	0.22**
Subjective norm			1	0.34**	0.24**	0.40**	0.18*	0.30**
Perceived control				1	0.46**	0.51**	0.04	0.38**
Perceived insufficient milk					1	0.45**	0.02	0.38**
Breastfeeding intention						1	0.29**	0.47**
Maternity leave							1	0.24**
Exclusive breastfeeding								1

\* $P < 0.05$ , \*\* $P < 0.01$

**Table 4. Multiple linear regression analysis of exclusive breastfeeding**

Variables	B	Standard error	Beta	t	P value	Variance inflation factor
Breastfeeding knowledge	-1.69	1.69	-0.07	-1.00	0.320	1.25
Breastfeeding attitude	0.11	0.41	0.02	0.25	0.800	1.41
Subjective norm	1.98	1.45	0.10	1.37	0.170	1.28
Perceived control	1.30	0.76	0.15	1.72	0.090	1.88
Perceived insufficient milk	3.17	1.25	0.19	2.54	0.010	1.42
Breastfeeding intention	4.64	1.69	0.23	2.75	0.010	1.74
Maternity leave	0.25	0.12	0.15	2.13	0.030	1.17
Constant	-152.63	45.78	-	-3.33	0.001	-

Note:  $R^2=0.299$ ,  $R^2(\text{adj})=0.270$ , standard error=61.425,  $F=10.342$ ,  $P<0.001$ , Durbin Watson=1.87

for the first 6 months (De Roza et al, 2019; Sandhi et al, 2020). Although it is generally recognised that most mothers are physically capable of producing sufficient milk (Galipeau et al, 2017), over half of the participants in the present study felt their supply of breast milk was inadequate for their infant. This perception may be attributed to misconceptions related to breast milk and breastfeeding. Although not formally included in the data for the present study, participants who strongly disagreed with the statement that their breast milk was nutritious enough to nourish their baby were asked why they had given this answer. Several expressed concerns about the thin appearance of breast milk resembling

rice water, which led them to question whether it would sufficiently satisfy their infants. Additionally, participants were asked to elaborate on their answers to questions regarding their baby's satisfaction after feeding, whether their baby appeared to like breastfeeding and whether they had enough milk. They reported that they felt that behaviours such as crying, fussiness and wakefulness indicated that their baby was unhappy with breastfeeding.

Perceptions of insufficient breast milk, both in quantity and quality, may prompt mothers to supplement with formula. This supplementation can lead to reduced feeding at the breast, subsequently diminishing lactation.

This may then exacerbate concern regarding insufficient milk supply among mothers, ultimately contributing to the premature cessation of exclusive breastfeeding. Interventions to enhance exclusive breastfeeding should address predictors of perceived insufficient milk and ensure that mothers form accurate perceptions of their milk supply.

In the present study, maternity leave was also a barrier to exclusive breastfeeding for 6 months. Similar findings have been reported in Thailand, emphasising maternity leave as a key workplace factor affecting exclusive breastfeeding (Tangsuksan et al, 2020). Two further studies have confirmed this predictive association (Alzaheb, 2017; Abou-ElWafa and El-Gilany, 2019). Approximately 60% of employed mothers worldwide work in places that are not regulated by national authorities, with 21% of women being allowed less maternity leave than their statutory allowance, and 55% receiving no paid maternity leave (Horwood et al, 2020). Pressure to return to work earlier, especially for mothers without paid maternity leave, can create challenges for exclusive breastfeeding. The present study found that almost one in 10 participants resumed work within 3 months of giving birth, and one in five returned within 4 months. At work, Guo et al (2022) reported that 81% of Chinese mothers had no private space for breastfeeding or expressing milk, and less than half could store breast milk in refrigerators in the workplaces. Given these findings, there is a need to improve implementation of maternity leave policies.

Previous studies have reported that breastfeeding knowledge (Wilson, 2018; Zhu et al, 2019), breastfeeding attitude (Nnebe-Agumadu et al, 2016; Wilson, 2018), subjective norm (Wu et al, 2017; Jama et al, 2020) and perceived control (Wilson, 2018; De Roza et al, 2019) are positive predictors of exclusive breastfeeding for 6 months. However, the present study did not find significant associations between these factors and exclusive breastfeeding. While knowledge is essential, understanding the benefits of breastfeeding or the recommended duration may not necessarily translate into actual practice. Knowledge alone may not be sufficient to overcome practical challenges and psychosocial influences shaping exclusive breastfeeding duration. The duration of exclusive breastfeeding is influenced by both psychological factors and external challenges (such as breastfeeding support in the workplace). Breastfeeding attitude, subjective norm and perceived control are psychological factors. According to the theory of planned behaviour, their impact on exclusive breastfeeding practice needs to be mediated through breastfeeding intention, which encompasses both psychological commitment and readiness to face external challenges.

## Key points

- In China, exclusive breastfeeding rates at 6 months are low, and do not meet the World Health Organization goal.
- Breastfeeding intention, perceived insufficient milk and maternity leave are predictors of exclusive breastfeeding at 6 months.
- Healthcare providers must identify those who are more likely to cease breastfeeding early and develop tailored interventions to promote exclusive breastfeeding for at least 6 months.
- Both the direct and indirect effects of breastfeeding knowledge, maternity leave, breastfeeding attitudes, subjective norm, perceived control, perceived insufficient milk, and breastfeeding intention in hospitals of different levels across China need further exploration.

## Strengths and limitations

The current study has several strengths. First, to the best of the authors' knowledge, this is the first study focusing on the influence of perceived insufficient milk and breastfeeding intention on exclusive breastfeeding for 6 months in Chinese culture. Second, unlike the majority of studies from China, which predominantly examined sociodemographic factors influencing exclusive breastfeeding for less than 6 months, this study explored into modifiable factors influencing adherence to the WHO's recommendation for exclusive breastfeeding for 6 months. Third, participants were encouraged to record exclusive breastfeeding daily, allowing for a calculation of the number of days that exclusive breastfeeding was maintained and avoiding the potential for overestimation that can occur with 24-hour recall.

However, the study also had limitations. It was conducted at only one tertiary hospital in a single city. The results may not be universally applicable across China. A national survey in hospitals of different levels is needed to provide a more comprehensive understanding. Additionally, although some independent factors showed no direct effect on exclusive breastfeeding for 6 months, they may have indirect effects that remain unclear and need further exploration. Finally, none of the variance inflation factors reached catastrophic levels, considering no multicollinearity. But it is important to note that the correlation between breastfeeding intention and perceived control was 0.51, which might impact the accuracy of the findings.

## Conclusions

Despite the health benefits for mothers and their infants, rates of exclusive breastfeeding in China remain low. In the present study, many participants ceased exclusive breastfeeding at around 4 months. Breastfeeding intention, perceived insufficient milk and maternity leave were significant determinants

of exclusive breastfeeding at 6 months. To improve exclusive breastfeeding in China, healthcare providers should endeavor to assess relevant factors in order to identify mothers who are more likely to halt exclusive breastfeeding early. Studies should explore the effectiveness of targeted interventions, such as reforming maternity leave policies and implementing psychosocial educational programmes, aimed at extending maternity leave, improving perceptions of milk supply and supporting the intention to exclusively breastfeed. **BJM**

**Acknowledgements:** *The authors would like to express their gratitude for the invaluable contributions made by the participants of this study and the instructors at the Faculty of Nursing, Burapha University.*

**Funding:** *No funding has been received for this work.*

**Data sharing:** *All data are available from the authors on reasonable request.*

**Author contributions:** *Conceptualisation of this study was carried out by QW, CW and PH, who were also involved in establishing the methodology and the write-up. QW performed data collection and analysis, while CW and PH were responsible for supervision, as well as reviewing and editing the manuscript.*

**Declaration of interests:** *The authors declare that there are no conflicts of interest.*

**Peer review:** *This article was subject to double-blind peer review and accepted for publication on 8 March 2024.*

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## CPD reflective questions

- How can healthcare providers effectively identify those who are more likely to cease breastfeeding before 6 months?
- What factors can present challenges for mothers who feel that they have an insufficient milk supply for their infants?
- What challenges can women face regarding breastfeeding and breast milk expression in the workplace?
- What measures could be implemented to extend the duration of exclusive breastfeeding in the first 6 months postpartum?

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