

Awareness, Intention, and Needs Regarding Breastfeeding: Findings from First-Time Mothers in Shanghai, China

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Abstract

Background and Objectives: Despite efforts, a decline in breastfeeding rates has been documented in China recently. This study explored the awareness of the World Health Organization (WHO) guidelines for breastfeeding and intention to breastfeed among first-time mothers and identified the gap between mothers' needs and perinatal care provision regarding breastfeeding promotion.

Subjects and Methods: In total, 653 women at 5–22 gestational weeks were recruited from four community health centers in Shanghai, China. They completed a self-administered questionnaire at recruitment. Two focus group discussions were held among third-trimester pregnant women who had received prenatal education. Twenty-four in-depth interviews were conducted among postpartum mothers.

Results: During early pregnancy, a substantial proportion of mothers were not aware of the nutritional value of breastmilk (40%) or the value of exclusive breastfeeding for 6 months (80%) or any breastfeeding for 24 months (98%). The awareness of the WHO guidelines for breastfeeding was associated with intention to breastfeed (adjusted odds ratio [OR] 2.67, 95% confidence interval [CI] 1.88, 3.78) or intention to breastfeed exclusively (adjusted OR 3.31, 95% CI 1.81, 6.06). In late pregnancy and postpartum, most mothers were still not fully aware of the breastfeeding recommendations and nutritional value of breastmilk. Limited communications with healthcare providers and lack of support for dealing with breastfeeding difficulties were reported.

Conclusions: Low awareness of the WHO breastfeeding guidelines was found among first-time mothers in Shanghai. Awareness of breastfeeding guidelines was independently associated with mothers' intention to breastfeed and intention to breastfeed exclusively. The health benefits of breastfeeding and the recommended duration of breastfeeding should be emphasized in prenatal education programs.

Background

BREASTFEEDING IS RECOMMENDED by the World Health Organization (WHO) as a key measure to ensure the health of mothers and children. In 2002, WHO updated the breastfeeding guidelines and recommended "all infants should be exclusively breastfed for the first six months of life, and receive nutritionally adequate and safe complementary foods while breastfeeding continues for up to two years of age or beyond" (WHA55 A55/15, paragraph 10, p. 5).¹

Efforts have been made to promote breastfeeding in China, where there are more than 10 million live births every year. The Baby Friendly Hospital Initiative has been scaled up in all regions of China since the 1990s.² The target for breastfeeding promotion was set in the National Program of Action for

Child Development of China in the 1990s and 2000s. Its aim was to promote the "exclusive breastfeeding" rate (defined as "breastfeeding while giving no other food or liquid, not even water, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicine")³ for 4 or 6 months and achieve an "any breastfeeding" (defined as "the child has received breast milk with or without other drinks, formula or other infant food")³ rate of 80% by 2000 and of 85% by 2010 (province-based) at 4 months.^{4,5} Following the WHO's lead, the China Nutrition Society also updated the national breastfeeding guidelines in 2007.⁶

Despite these efforts, a decline in breastfeeding has been documented in China recently. The rate of full breastfeeding (defined as "while breastfed an infant may also receive small amounts of culturally valued supplements—such as water,

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water-based drinks, fruit juice")³ for infants 0–5 months was 49% in 2006 and only 28% in 2008.^{7,8} Data from the 4th National Health Services Survey (in 2008)⁹ revealed that the exclusive breastfeeding rate in urban areas was only 15.8% for infants ≤ 6 months. Furthermore, a survey ($n=3,414$) conducted in 2002 covering five large cities from different regions of China (Guangzhou, Shanghai, Chongqing, Xi'an, and Changchun) showed that the "any breastfeeding" rates at 4, 6, 12, and 24 months were only 61%, 50%, 5%, and 0.4%, respectively. These were much lower than in other countries like Australia and the United States.^{3,10}

Breastfeeding decisions and practices are influenced by a wide range of factors, including knowledge, attitudes, beliefs, and sociocultural environments.^{11–14} A recent study showed that awareness of the WHO breastfeeding recommendations was strongly associated with intention to breastfeed among mothers in southwest Sydney, Australia.¹⁵ Other studies have repeatedly found that women's pre-birth breastfeeding intentions are a good predictor of the actual duration of breastfeeding.^{16,17} However, no studies in China have explored mothers' awareness of the WHO breastfeeding guidelines and the relationship between this awareness and intention to breastfeed, and none has examined mothers' perceptions of breastfeeding and whether there is any gap between perinatal health care and mothers' needs for breastfeeding.

The aims of this study were to explore mothers' awareness of the WHO guidelines for breastfeeding and their intention to breastfeed. The study also aimed to identify the gap between mothers' needs and perinatal care provision for breastfeeding.

Subjects and Methods

Study design

This was part of an intervention study (quasi-experimental design) that aimed to investigate the effectiveness of short mobile message health promotion on infant feeding practices. To explore the breastfeeding issues, we analyzed the baseline data collected by mixed quantitative and qualitative methods. The study was approved by the Institutional Review Board of the School of Public Health, Fudan University, Shanghai, China and the Human Research Ethics Committee of the University of Sydney, Sydney, Australia. Written informed consent was obtained from each participant.

Four community health centers (CHCs) were purposively selected as the project sites in two districts of Shanghai, China. In Shanghai, maternal and child health (MCH) care is provided by CHCs and maternity hospitals. Usually, a pregnant woman needs to register and receives the "Pregnant Women Healthcare Card" at around 12 gestational weeks at the health center of the community where her household registration is held. She receives early antenatal care, including the first prenatal education on breastfeeding there. From about 20 weeks of gestation the pregnant woman receives antenatal care and delivery service at the maternity hospital of her choice, where free prenatal education is provided on about four occasions in groups. There is one session delivered by nurses focusing on breastfeeding knowledge, and the education usually lasts for around 1 hour. After childbirth, most new mothers are encouraged to initiate breastfeeding as soon as possible in the delivery room or operating room by midwives or nurses. In maternity ward, a new mother will get detailed guidance for breastfeeding practice from nurses such

as postures for breastfeeding, more sucking by the baby, nipple treatment, etc. The content and quality of breastfeeding guidance vary from delivery hospital to delivery hospital. After discharge from the hospital, the new mother is referred back to the CHC in her household registration area. The mother and baby are followed up by the CHC staff, who understands their overall health status with usually one to three home visits within the first month after delivery. CHCs are also responsible for child healthcare services from age 0 to 6 years.¹⁸

Quantitative study

Participants. When mothers attended the CHC for the first time around 12 weeks of their pregnancy, they were approached by MCH staff with a letter of invitation and information about the main study. Mothers were eligible to participate if they were first-time mothers, were older than 20 years, had at least completed junior high school education (9 years), had conceived a singleton fetus, and had no illness that limits breastfeeding after childbirth. From around 1,200 women approached between October 2010 and January 2011, in total, 653 mothers at 5–22 weeks of gestation were recruited.

Data collection. Participating mothers were invited to complete the self-administered questionnaire prior to the first time of prenatal education using the questions adapted from the Healthy Beginning Trial.¹⁵ Questions included demographics and health information, access to social support, awareness of the WHO breastfeeding guidelines, intention to breastfeed, knowledge of infant feeding, and awareness of childhood obesity. There were six questions related to the WHO breastfeeding guidelines, including the nutritional value of breastmilk, the health benefits of breastfeeding, the recommended duration for exclusive breastfeeding, and any breastfeeding. Mothers were also asked to provide main reasons for intending or not intending to breastfeed using an open-ended question.

Data analysis. Each of the six questions about the WHO breastfeeding guidelines was graded with one score, with pregnant women receiving 0 for none correct to 6 for all correct answers. Based on the women's scores they were categorized into the "high" or the "low" awareness groups, depending on their score equal/above or below the medium score.

Statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS) for Windows version 17.0. One-way analysis of variance/ t test was used to determine differences for continuous outcomes, whereas the Pearson χ^2 test was used for categorical outcomes, and Mantel-Haenszel χ^2 tests were used for trend in proportions. Multiple logistic regression was performed for determining the factors associated with awareness of breastfeeding guidelines and intention to breastfeed. Unadjusted odds ratios (ORs) and adjusted ORs were calculated for assessing the likelihood of intention to breastfeed.

Qualitative study

Participants. Purposive sampling was applied in recruiting participants. Twenty-four new mothers (1–11 months after childbirth) were interviewed using semistructured in-depth interviews and focused group discussions. Among them, nine practiced exclusive breastfeeding or had experienced 4–6 months of exclusive breastfeeding, nine used mixed

infant feeding, and six had stopped breastfeeding before the baby turned 4 months.

Two focused group discussions were conducted with pregnant women in the third trimester who had completed the prenatal education programs provided by delivery hospitals. Fourteen pregnant women were recruited from two large communities, seven from each, respectively.

Data collection. For the in-depth interviews, postpartum mothers were approached by CHC staff in the child health clinics of each CHC when they brought babies for health check-ups. If they agreed to be interviewed, appointments were set up. The interview guide was piloted before interviews. All mothers were asked about their experience of breastfeeding, awareness of the WHO breastfeeding guidelines, problems encountered during breastfeeding, reasons for breastfeeding or not breastfeeding, reflections on breastfeeding service during perinatal care, and planned duration of breastfeeding if mothers were breastfeeding.

For the focused discussion groups, the CHC staff contacted potential participants by telephone, verified their eligibility, and arranged a focused discussion group time. The focused discussion group examined mothers' experiences of prenatal

education and reasons behind their intentions of breastfeeding or not.

All interviews were carried out in a private room. Two researchers from the MCH Department of the School of Public Health, Fudan University, who have been trained for qualitative research conducted all the interviews, one as the facilitator and the other as the recorder. All qualitative interviews were digitally recorded. Each interview lasted between 30 to 60 minutes.

Data analysis. All recorded materials were transcribed verbatim by the interviewer and the recorder and other research assistants. Transcripts were kept as Microsoft Word documents. A de-identification process was applied during data analysis. A content analysis approach was used to categorize the transcript contents.¹⁹ Two interviewers carefully reviewed the transcripts to identify emerging themes and coded for themes using Nvivo version 7.0 computer software.

Results

The main characteristics of the participants are shown in Table 1. The mean age of the mothers was 28 years (range,

TABLE 1. CHARACTERISTICS OF PARTICIPANTS AND FACTORS ASSOCIATED WITH INTENTION TO BREASTFEED AND EXCLUSIVELY BREASTFEED ON BIVARIATE ANALYSIS

Characteristic	Of total n=653, n (%)	Intention to breastfeed		Intention to exclusively breastfeed	
		Yes n (row %)	p	Yes n (row %)	p
Age (years)					
<25	77 (11.8)	67 (87.0)	0.330 ^a	30 (39.0)	0.755 ^a
25–29	384 (58.8)	350 (91.4)		114 (29.7)	
≥30	192 (29.4)	176 (91.7)		70 (36.5)	
Household registration					
Non-Shanghai	498 (76.3)	454 (91.3)	0.527	336 (67.5)	0.814
Shanghai	155 (23.7)	139 (89.7)		103 (66.5)	
Pregnant women's education level					
Junior middle school	21 (3.2)	20 (95.2)	0.522 ^a	16 (76.2)	0.897 ^a
Senior middle school	70 (10.7)	64 (91.4)		44 (62.9)	
College and above	562 (86.1)	509 (90.7)		379 (67.4)	
Partner's education level					
Junior middle school	14 (2.1)	13 (92.9)	0.788 ^a	9 (64.3)	0.969 ^a
Senior middle school	58 (8.9)	53 (91.4)		40 (69.0)	
College and above	581 (89.0)	527 (90.9)		390 (67.1)	
Family income per month					
<4,000 RMB	47 (7.2)	6 (12.8)	0.337	19 (40.4)	0.233
≥4,000 RMB	604 (92.5)	52 (8.6)		193 (32.0)	
Women's employment status					
Unemployed	106 (16.2)	93 (87.7)	207	64 (60.4)	0.101
Employed	547 (83.8)	500 (91.6)		375 (68.6)	
Intended time back to work					
<6 months	496 (76.0)	450 (90.9)	0.049	329 (66.3)	0.094
≥6 months or don't plan to go back	83 (12.7)	80 (96.4)		64 (77.1)	
Don't know	74 (11.3)	63 (85.1)		46 (62.2)	
Rented accommodation					
No	152 (23.3)	49 (9.8)	0.138	328 (65.7)	0.127
Yes	499 (76.4)	9 (5.9)		110 (72.4)	
Awareness of breastfeeding guidelines ^b					
Lower	289 (44.3)	248 (85.8)	<0.001	162 (56.1)	<0.001
Higher	364 (55.7)	345 (95.0)		127 (43.9)	

^aBy Mantel-Haenszel χ^2 test.

^bMean score, 3.6; median score, 4.0.

20–41 years). Nearly 90% of mothers were employed and reported their monthly family income as 4,000 RMB (~USD \$615, middle–low living condition) or more. About 76% of women planned to return to work within 6 months after childbirth. The average gestational age of mothers was 11 weeks (range, 5–22 weeks) at the time of the baseline study.

Mother’s awareness of the breastfeeding guidelines prior to receiving prenatal education

The median score of awareness of the WHO breastfeeding guidelines was 4.0 (range, 1.0–6.0). Although almost all mothers (99%) knew breastfeeding was good for the baby’s health, 22% of mothers did not think breastfeeding was beneficial to the mother’s health. Close to 80% and nearly all mothers (98%), respectively, were not aware of the WHO-recommended duration for exclusive breastfeeding or any breastfeeding. In addition, approximately 40% of mothers did not think breastmilk could meet all the nutritional needs for babies less than 6 months old.

Mother’s intention to breastfeed in early pregnancy prior to receiving prenatal education

Prior to receiving any prenatal education, 91% of expectant mothers planned to breastfeed their babies, and the remaining 9% had yet to decide. Only two women claimed that they would not breastfeed. Sixty-seven percent of mothers planned

to exclusively breastfeed their babies, only 9% planned not to exclusively breastfeed, and 24% had not decided. Table 1 shows the factors associated with intention to breastfeed on bivariate analysis.

After multivariate analyses, the only factor associated with the mother’s intention to exclusive breastfeeding was the mother’s awareness of the breastfeeding guidelines (Table 2). Mothers who had a higher awareness score intended to breastfeed (OR 2.67, 95% confidence interval [CI] 1.88, 3.78, $p < 0.001$) and intention to breastfeed exclusively (OR 3.31, 95% CI 1.81, 6.06, $p < 0.001$). In addition, compared with mothers intending to go back to work within 6 months after childbirth, mothers who intended to stay at home for ≥ 6 months were more likely to breastfeed (OR 1.89, 95% CI 1.03, 3.47, $p = 0.039$).

Reasons of breastfeeding intention among mothers in early pregnancy

The main reasons given by the 537 mothers to the open-ended question on the intention to breastfeed in the survey were for the health benefits of the child and mother, for example: “...to ensure baby’s health. Baby will have better immunity” and “Safe, natural, nutritional, good for both baby and mother.”

Among the 43 mothers who had not decided whether to breastfeed or not, the main issues are revealed in Table 3. The

TABLE 2. FACTORS ASSOCIATED WITH INTENTION TO BREASTFEED AND EXCLUSIVELY BREASTFEED IN MULTIPLE LOGISTIC ANALYSIS (N=653)

Variable	Intention to breastfeed			Intention to exclusively breastfeed		
	OR	95% CI	p	OR	95% CI	p
Age (years)						
< 25	1			1		
25–29	1.774	0.9783–2.220	0.059	2.095	0.884–4.966	0.093
≥ 30	1.234	0.652–2.336	0.519	2.077	0.795–5.424	0.136
Household registration						
Non-Shanghai	1			1		
Shanghai	1.006	0.659–1.563	0.979	0.885	0.456–1.721	0.720
Pregnant women’s education level						
Junior middle school	1			1		
Senior middle school	0.362	0.109–1.203	0.097	0.348	0.036–3.408	0.365
College and above	0.321	0.097–1.065	0.063	0.187	0.019–1.824	0.149
Family income per month						
< 4,000 RMB	1			1		
$\geq 4,000$ RMB	1.484	0.744–2.959	0.263	1.499	0.510–4.408	0.462
Women’s employment status						
Unemployed	1			1		
Employed	1.612	0.942–2.758	0.081	1.657	0.706–3.888	0.246
Intended time back to work						
< 6 months	1			1		
≥ 6 months or don’t plan to go back	1.894	1.033–3.471	0.039 ^a	2.707	0.756–9.697	0.126
Don’t know	1.071	0.578–1.986	0.828	0.683	0.275–1.695	0.411
Rented accommodation						
No	1			1		
Yes	1.438	0.910–2.271	0.119	1.887	0.824–4.321	0.133
Awareness of breastfeeding guidelines						
Lower	1			1		
Higher	2.666	1.878–3.784	< 0.001 ^a	3.307	1.805–6.059	< 0.001 ^a

^aSignificant difference.
CI, confidence interval; OR, odds ratio.

TABLE 3. THE MAIN REASONS GIVEN BY THE WOMEN WITHOUT INTENTION TO BREASTFEED AT EARLY PREGNANCY

<i>Reasons for not having decided to breastfeed</i>	<i>Number (%) of total n=43</i>	<i>Examples of what women said</i>
Concerns about insufficient milk supply	16 (37)	"Not sure whether I will have enough breastmilk because my breasts looked small"
Had not yet thought about it	10 (23)	"Have not yet thought about it"
Concerns about HBV transmission to the baby	6 (14)	"I have hepatitis B and don't know whether baby would have it through breastfeeding"
Concerns about their own figure	4 (9)	"Breastfeeding will influence my breast figure"
Felt lack of sufficient knowledge	3 (7)	"Not know too much about breastfeeding, will decide after know more about it"
Other reasons included lack of freedom, time conflict with work, and cracked nipples	4 (9)	"I will be occupied by the baby all the time if breastfeed"
<i>Not planning to breastfeed</i>	<i>Number (%) of total n=2</i>	
Do not want breastfeeding	1 (50)	"Just do not want breastfeeding"

HBV, hepatitis B virus.

main reasons for not having decided to breastfeed included the reasons "concerns about insufficient milk supply," "had not yet thought about it," "concerns about HBV [hepatitis B virus] transmission to the baby," "concerns about their own figure," "felt lack of sufficient knowledge," etc.

There were two mothers who did not plan to breastfeed: One responded, "Just do not want breastfeeding," and the other one did not give any reason.

Perceptions on breastfeeding among mothers in late pregnancy and postpartum

The qualitative study revealed that mothers in their late pregnancy or postpartum period had some knowledge about the health benefits of breastfeeding and the recommended duration of exclusive breastfeeding. However, they still did not know the key components of the WHO breastfeeding guidelines. Some mothers considered that mixed feeding could provide more nutrition to their babies and that it was convenient for weaning. No mothers knew the recommended

duration for any breastfeeding. Many were misinformed by traditional perceptions, for example, that breastmilk would not have any nutritional value after the mother resumed menstruation and therefore breastfeeding should be stopped.

As shown in Table 4, although mothers would trust the information provided by health professionals, they reported that MCH doctors were often too busy to deliver sufficient information on breastfeeding during perinatal care visits. Consequently, the Internet, books, families, and friends became the major sources of information on breastfeeding. Furthermore, the prenatal education programs were only offered during business hours, which prevented most mothers from attending.

Discussion

This study found that prior to receiving prenatal education, a substantial proportion of mothers were not aware of the nutritional value of breastmilk (40%) or the WHO-recommended duration of exclusive breastfeeding (80%) or any breastfeeding (98%). Mothers' intention to breastfeed or intention to breastfeed exclusively was significantly associated with their awareness of the WHO breastfeeding guidelines in early pregnancy. In late pregnancy and postpartum, the majority of mothers still did not fully understand the nutritional values of breastmilk or the recommended duration of breastfeeding. Lack of communication and support from the healthcare providers has been identified. These results highlight the importance of promotion and support of breastfeeding in perinatal care services to address the unmet needs.

The strength of this study was that we used a concurrent design with quantitative and qualitative mixed methods to explore breastfeeding issues among first-time mothers in Shanghai, China, in order to tackle the recent decline of breastfeeding in China, particularly in large cities. The quantitative component of our study provided the empirical evidence of the link between mothers' awareness and their intention of breastfeeding. The qualitative component allowed participants to play an active role in identifying problems through voicing their opinions and perceptions in relation to breastfeeding. In addition, the participants of the study were at the different stages of receiving MCH services in the health system (i.e., early and late pregnancy and postpartum), which allowed us to gather information on services provided particularly in relation to breastfeeding promotion across different services. Thus, the qualitative component allowed for the emergence of contextual meaning, as a complement to the quantitative data. Our findings about mothers' awareness, intention, and needs regarding breastfeeding will significantly contribute to the body of evidence that supports the promotion of the WHO breastfeeding guidelines and addresses mothers' needs in relation to breastfeeding.

The positive association between the awareness of the WHO breastfeeding guidelines and the intention to breastfeed or intention to breastfeed exclusively suggests that breastfeeding promotion and education should be initiated early, when mothers have their first visit to the CHC (around 12 gestational weeks). This association was consistent with the study by Wen et al.¹⁵ in which participants were recruited from Week 24 to 34 of gestation. Our study showed that the positive relationship between awareness and intention existed even among women in relatively early pregnancy,

TABLE 4. THEMES AND SUPPORTING QUOTES ABOUT THE UNDERSTANDING OF BREASTFEEDING AMONG PREGNANT WOMEN AT THE THIRD TRIMESTER AND POSTPARTUM MOTHERS

Themes	Selected quotes	
	Pregnant women (focused group discussion)	Postpartum mothers (in-depth interview)
Awareness of some components of breastfeeding guidelines		
1. Know the general health benefit of breastfeeding	<p>"[Breastfeeding is] good for baby's, especially the foremilk very good for baby's immune system. In addition, breastfeeding could improve the mother-baby relationship" (28 years old, 34th gestational week, teacher)</p>	<p>"Breastfeeding is the best. It is safe. You know the 'melamine infant formula contamination incidents^a in 2008,' I worry about the quality of formula" (28 years old, 6 months postpartum, mixed breastfeeding, company employee)</p>
2. Know the recommended duration for exclusive breastfeeding	<p>"In the prenatal education, I knew exclusive breastfeeding should last for 6 months" (30 years old, 37th gestational week, dentist)</p>	
Misunderstanding of breastfeeding		
3. Don't actually know the difference between breastmilk and formula; regard mixed feeding as the ideal way to ensure nutrition and convenience of weaning	<p>"If baby is fed by a mixed way, the nutrition would be better. I know foremilk would help baby's immune system, but how about other nutrients? Formula has many nutritional elements...Furthermore, it would be easy for weaning..." (34 years old, 35th week gestational, teacher /dancer)</p>	<p>"Although I know breastfeeding is good, but what's the difference between breastmilk and infant formula? Formula includes many nutrients. Does breastmilk have enough [nutrients] too? I don't know" (34 years old, 2 months postpartum, mixed feeding, company employee)</p>
4. Unawareness of the recommended duration for breastfeeding and traditional idea about discontinuing breastfeeding	<p>"Usually breastfeeding would last for 9-10 months, at most 1 year" (31 years, 36th week, teacher)</p> <p>"After menstruation resumed, breastmilk would have no any nutrition value, just like water" (34 years old, 35th gestational week, teacher/dancer)</p>	<p>"I know from my doctor that breastfeeding should last for 10-12 months" (30 years old, 7 months postpartum, mixed breastfeeding, physician)</p> <p>"Many people told me that after the menstruation resumed, breastmilk would have no any nutritional value" (31 years old, 4 months postpartum, exclusively breastfeeding, company employee)</p>
Feedback on breastfeeding service through perinatal care		
5. Don't have time to join in the prenatal education	<p>"[I did not join in the prenatal education] since I have to work" (28 years old, 34th gestational week, company employee)</p>	<p>"There were prenatal classes in hospitals, but I just didn't have time to attend...I needed to work" (28 years old, 2 months postpartum, exclusively breastfeeding, physician)</p>
6. Don't have enough communication with MCH care providers	<p>During prenatal care: "It was very fast for each antenatal check-up, less than 10 minutes. But I had to wait for [the doctor] more than 3 hours" (27 years old, 36th gestational week, company employee)</p>	<p>During childbirth in hospitals: "No specific guidance on breastfeeding when I lived in hospital after childbirth. They (health staff) just told us not to bring bottle milk to the</p>

(continued)

TABLE 4. (CONTINUED)

Themes	Selected quotes	
	Pregnant women (focused group discussion)	Postpartum mothers (in-depth interview)
		hospital. Every day, nurses asked me whether I had breastmilk. If I had not, she then gave us a cup with a fixed quantity of formula to feed the baby every 4 hours. They didn't require me to breastfeed my baby and didn't teach me how to breastfeed the baby" (35 years old, 2 months postpartum, formula feeding, company employee)
	"There are always a lot of patients. Doctors must be bored since every woman has a lot of questions" (28 years old, 34 th gestational week, company employee)	During child health care: "At the kid health check-up, doctors just asked me whether my baby was having breastmilk or formula. They didn't say any others" (30 years old, 8 months postpartum, mixed feeding, unemployed)
7. Get the knowledge and information of breastfeeding mainly from Internet, books, friends, and families	"Some prenatal education will have charge. Internet is very convenient to get all information. No need to take the class" (29 years old, 35 th gestational week, company employee)	"Usually I know [breastfeeding] from the Internet and one book. I was encouraged and decided to breastfeed by one book" (27 years old, 1 months postpartum, mixed feeding, company employee)
8. Need support to deal with the difficult during breastfeeding		"No any health staff member told me how to deal with the insufficient breastmilk production. How can I produce enough breastmilk?" (34 years old, 2 months postpartum, mixed feeding, company manager) "The baby had a disease 1 month ago and he stopped breastfeeding himself" (29 years old, 8 months postpartum, having ceased breastfeeding, accountant)

^aInfant formula contamination incidents. A food safety incident in China revealed in September 2008 that powdered formula, fresh milk, and other products in China were found to be adulterated with melamine, a synthetic nitrogenous product, to confound a test for determining crude protein content.

MCH, maternal and child health.

before 22 gestational weeks, prior to receiving prenatal education. A recent review concluded that breastfeeding intention was a strong indicator for breastfeeding initiation and duration.²⁰ Therefore, improving mothers' awareness and addressing mothers' intention to breastfeed will help to improve breastfeeding practice.

In this study, planned longer maternal leave was shown to be associated with stronger intention to breastfeed. However,

more than 75% of mothers revealed that they would need to return to work within 6 months after childbirth. Thus, the appropriate public policies are required to remove barriers and to create enabling environments at the workplace for women to continue breastfeeding and facilitate mothers to meet the WHO recommendations.

Consistent with other studies,²¹ we found that the health benefits of breastfeeding served as a strong incentive for

mothers' intention to breastfeed. We also found that mothers' hesitation in breastfeeding their babies was due to the concern about insufficient breastmilk supply, which has been reported by other studies.^{12,15,22} Furthermore, concerns about mother-to-child hepatitis B transmission were also expressed by those mothers who were hepatitis B positive.²³ Targeted health promotion efforts should be directed to address the concerns of these mothers.

This study also revealed that the infant formula contamination incidents that occurred in China in 2008 greatly weakened mothers' trust in the quality of infant formula. The event had motivated mothers to breastfeed their babies, which is a window of opportunity to accelerate the promotion of breastfeeding in China. As a study had shown the incidents had a significant positive impact on breastfeeding among Chinese mothers,²⁴ it is promising to translate mothers' intention to successful breastfeeding practice through appropriate support. As indicated in this study, however, the current perinatal care model does not provide sufficient support for breastfeeding. The perception of the superior nutritional value of formula could be the result of inadequate information provision about breastmilk during perinatal care and the successful marketing of infant formula. The misunderstanding of mixed infant feeding among mothers in this study was similar to the findings of Holmes et al.,²⁵ who showed the inadequate advocacy on exclusive breastfeeding by health professionals and lack of supportive social environment for breastfeeding. The extensive impact of traditional perceptions on breastfeeding duration among mothers, newly reported by this study, further highlights the inadequate provision of health promotion in the current MCH service. Young mothers obtained breastfeeding information mainly from their own mothers or mothers-in-law, colleagues or friends, the Internet, and books, rather than from health professionals. This indicates that health professionals had not played an active role in providing correct information. The difficulties and concerns raised by mothers in this study, such as "insufficient breastmilk," what to do in situations with "mother or child being sick," and "cracked nipples," have been reported by many other studies.^{6,26-29} This further suggests inadequate guidance on breastfeeding practice. One study has shown that professional support had the most important influence on breastfeeding intentions and behaviors.³⁰ Health professionals' support could either increase exclusive breastfeeding³¹ or prolong any breastfeeding.³² Thus, approaches to enhance professional supports should be explored as an important component for breastfeeding promotion in the next step.

This study has several limitations. First, because of its cross-sectional design, no causal relationships can be concluded in relation to the study findings. Second, the study sample had a large proportion of well-educated women, which could lead to selection bias and limit its generalizability, although it may be a true reflection of Chinese urban areas where young people have more opportunities to study in colleges and universities since the expansion of high education in the 1990s. In addition, further studies are needed to explore whether awareness and intention of breastfeeding can be translated to future breastfeeding practice.

Conclusions

Low awareness of the WHO breastfeeding guidelines was found among first-time mothers in Shanghai. Awareness of

the breastfeeding guidelines was independently associated with their intention to breastfeed and intention to breastfeed exclusively. The health benefits of breastfeeding and recommended breastfeeding duration should be emphasized in prenatal education programs when encouraging mothers to comply with the WHO breastfeeding guidelines. Specific concerns about breastfeeding and breastfeeding difficulties encountered by mothers should be addressed by health providers in a more supportive manner. It is important to advocate for appropriate public policy on maternal leave and for a workplace breastfeeding-friendly environment to support mothers returning to work.

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